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EDITORIAL.

Apothecaries in the Navy.

A NUMBER of apothecaries in the navy have undertaken to improve the status of their corps by securing an Act of Congress making them warrant officers instead of enlisted men, as we believe they now are. The bill reads as follows:

Be it enacted, etc., etc.:

1st.—That apothecaries in the navy shall hereafter be warrant officers, and shall receive the pay and privileges now allowed that grade of officers; but no person shall be appointed an apothecary in the navy who has not been examined and found qualified by a board of naval medical officers, designated by the Secretary of the Navy.

2d.—That each and every apothecary now in the U. S. Naval Service shall be granted an examination by said board, and, if found proficient in the branches pertaining thereto, shall receive the benefits of this Act.

This does not, as will be seen above, contemplate the elevation of the corps to the rank of commissioned officers, but merely entitles its members to the quarters and other privileges assigned to midshipmen, master's mates, gunners, carpenters, and similar officers in the service, and relieves them from the obligation to mess with seamen and other enlisted men. The request, in view of the social and intellectual standing of those chiefly concerned, is certainly modest, and since it requires the same qualifications of those now in the service as of those who may hereafter enter it, it cannot be thought unfair.

We have had personal acquaintance with the apothecaries of the navy, as well as some familiarity of the duties required of them, and cordially solicit for them the support of pharmacists generally.

Mr. C. E. Reynolds, of the U. S. Receiving Ship Colorado, at the New York Navy Yard, will be glad to receive such expressions of approval as may be sent to him, and Mr. Starr H. Ambler, wholesale druggist, at 36 Vesey street, has consented to receive any money that may be contributed to defray the expense of legislation. The latter should be sent before the 1st of August next.

The Proposed Pharmacy Law.

A COMMITTEE of gentlemen interested in the enactment of a law in this State to regulate the practice of pharmacy, and restrict it to those who possess the requisite knowledge, have recently issued a circular soliciting the aid of all who are concerned. The bill now before the Legislature is, in essential features, the same as that offered last year, the only notable difference being the omission of the portion relating to adulterations, this being provided for in the special act now in force. Its principal features are summarized as follows:

It permits all who are in business at the date of its passage to so continue, providing they are registered within a specified time.

It does not attempt the discharge or examination of any clerk employed at the time of its passage.

It provides for annual registration at a fee not exceeding one dollar.

It will require examination of all who enter the business after its enactment, as a means for ascertaining their fitness to practise pharmacy.

It is not the intention of those who have drafted the bill to impose any hardship or affect the business of any one; nor is it believed that such result can follow the passage of the Act, but there is every reason to presume that its enforcement will be of great benefit to the pharmaceutical profession, as well as to the public generally.

The only clause to which exception may be made is the imposition of an annual fee for registration. In no other

way, however, can the money be obtained which is needed to defray the expense of annual registration; and without the latter, owing to the frequent changes due to death, removal, and other causes, the law would soon become inefficient.

As an evidence of the skill with which the bill has been drafted, we may say that it has already been adopted as the basis for similar legislation elsewhere. We believe that those who so desire, may obtain copies of the bill from Dr. A. B. Huested, of Albany, and we hope that a sufficient number of our readers in this State may aid the Committee with their personal influence to secure its adoption during the present session of the Legislature.

Pharmaceutical Legislation in Wisconsin.

THE Legislature of Wisconsin has before it a bill providing for the establishment of a board of examiners in pharmacy, and to regulate the practice of pharmacy and the sale of poisons. The bill, in most of its features, resembles the one now before the Legislature of this State, and its details may be learned of Mr. E. B. Heimstreet, of Janesville, Rock County, the Secretary of the Wisconsin Pharmaceutical Association.

Dr. George Bentham.

IN our January number we announced, on the authority of several prominent European papers, the death of this eminent botanist. We have, however, since then learned that was this an error, and we hasten to make the correction. Dr. Bentham has lately completed the manuscript of the concluding volume of the *Genera Plantarum*, and it is a matter of general congratulation that this great work, begun over twenty years ago, will thus be brought to a successful conclusion.

The Scientific American.

IT will be a source of satisfaction to the numerous readers of our esteemed contemporary to know that since the destruction of its offices by the recent fire in Park Row, it has secured better and more commodious quarters at 261 Broadway, corner of Warren street. Fortunately its subscription lists, account books, patent records, drawings, and correspondence were all preserved in fire-proof safes; and the fact that the materials and machinery used in printing were in another building and were unharmed, has enabled it to proceed without interruption of its business.

[ORIGINAL COMMUNICATION.]

Liatris Odorotissima Willd. (Dog Tongue, Hound's Tongue, Vanilla)—Botanical and Chemical Notes.

BY THOMAS F. WOOD, M.D., OF WILMINGTON, N. C.

A HANDSOME annual plant, with perennial roots, belonging to the *natural order Compositæ*.

Botanical Description.—Entire plant smooth. Stem branched above, and varying from green to purplish at time of maturity. *Root leaves* arranged in a circle, from four to fifteen inches long, by one to three inches wide; smooth, entire; varying in color from pale-green (when grown in damp, rich soil) to a deeper green (when grown in dryer soil); often glaucous, thickish, obovate-spatulate; three to five ribbed. *Stems* two to five feet high. *Leaves of stem* clasping, diminishing in length to the corymbs, which are leafless; obtusely dentate.

Heads usually seven-flowered, in many cymes, constituting a large, loose corymb. Flowers bright purple; corolla five-lobed, lobes ovate; achenia tapering to the base; pappus minutely bearded, not plumose.

Root not tuberous, as in many species of this genus; perennial.

History.—For many years *L. odoratissima* has been commonly used, on the southern seaboard, by housekeepers, for the prevention of moths, and by smokers for aromatizing tobacco. It was first collected in quantity near Wilmington, N. C., by M. Giard, a French teacher, in 1849. No accounts of the collection of large quantities have reached us, until after the end of the late war. Its employment by smoking-tobacco manufacturers gave great reputation to certain brands, and attracted attention to the plant, so that for several years it has been a commercial tonka bean.

The distribution of *Liatris odoratissima* is quite abundant, but peculiar. From North Carolina to Florida, in the Savannahs, and moist, pine lands, it is found in greater or less amounts. It disappears for miles in some regions quite similar—where other species of Liatris grow, and where one would expect, by nature of the soil, etc., to find it. It grows in circular clumps, among the wire-grass (Sporobulus junceus *Kunth*) and in open spaces, the largest clumps of leaves usually not sending up a flower-stalk. The soil is a thin, moist, sandy loam, quite dense while moist. The earliest appearance of leaves is in May; it flowers in September and October. Drainage of land causes it to disappear in a few seasons. The leaves reach their greatest maturity just after the flowering season, and after a hard frost lose their fragrance. The leaves are often depredated upon by insects, but seem to be avoided by cattle. The gay purple heads of flowers are very attractive, but entirely inodorous.

Liatris has no ascertained medicinal properties. It has for a long time had a reputation for the prevention of moths, and housekeepers formerly employed it largely for this purpose. Since the war, experiments with it were made in the Quartermaster's Department at Washington, showing conclusively that woollen clothing packed carefully with well-cured leaves were not in the least protected from the ravages of moths. The demand now for the plant is confined to tobacco manufacturers and perfumers. A most delightful perfume, resembling the odor of quinces, results from the distillation of an alcoholic tincture, giving a basis for a series of new odors, if skilfully managed.

Properties.—The leaves are rarely very slightly odorous when green, but drying develops a very pleasant odor, quite like that of the tonka bean, likened by some also to the odor of vanilla; from this latter fact it gets one of its local names, *vanilla*.

Shining acicular crystals are sometimes formed on the surface of the leaves in the green state as the plant reaches its greatest maturity. When dried, even partially, matured leaves have deposits of crystals upon their surfaces, but the matured leaves, when dried, yield them more abundantly.

In the early season, the leaves are very succulent, losing

sixty to seventy per cent in drying; but in September the loss hardly exceeds twenty per cent.

The odor of the leaves resides in the crystals, although not exclusively. The appearance of these surface crystals was years ago noticed by Donald McRae, Esq., of Wilmington, who brought it to the attention of the late Mr. William H. Lippitt, an apothecary. Up to that time the crystal deposit was believed to be a potash salt. Its character was determined by Mr. Wm. Procter, Jr., in 1859, at the request of Mr. Lippitt. Mr. Procter found it to be identical with *coumarin*, the crystallizable odorous principle of tonka bean.

The leaves retain their fragrance for many years after they are gathered, a damp atmosphere developing it for months after all appearance of activity has disappeared. The odorous exhalation from the leaves is volatile, being more perceptible in the upper stories of warehouses where it is kept.

Collection and preparation for market.—The root leaves are almost exclusively collected, both on account of their size and the facility of gathering a clump of leaves in one handful. The roots are not generally disturbed, and it is currently believed that a better yield, both as regards quality and quantity, is secured on ground that has been previously picked over the year before. Women and children work together in the Savannahs, one set gathering leaves, which the same day are spread out to dry in the sun, while another set takes them to market. When the bundles are received at the store of the purchaser, the leaves are in half dried or wilted condition, and are there selected and spread out for more thorough drying in the shade, preparatory to baling for shipment. An active young person can gather daily, in a good territory, leaves amounting in weight, when dried, to from eighteen to twenty-five pounds; most of them do much less.

Chemistry.—From my examinations, it seems that the odorous principle is not confined to the coumarin, for after the leaves have been exhaustively treated by boiling dilute alcohol, and all the coumarin separated, the remaining extract is still distinctly odorous.

Coumarin can be separated as follows: Boil the leaves with dilute alcohol, filter off the fluid, then pack a percolator with the same leaves, and pass enough boiling dilute alcohol through until there is but little color obtained. Distil off the alcohol until slight iridescence appears on the surface of the liquid then pour it off in a shallow vessel to cool. When cold, coumarin crystallizes in acicular tufts. Drain the crystals, redissolve in hot water, and re-crystallize, and they become nearly white.

Several rough experimental assays of the quantity of coumarin to a given weight of leaves gives the following result:

One pound dried leaves one year old yielded two drachms of purified white crystals. One pound of recently-cured leaves yielded about two and one-half drachms.

The odor of the older leaves was quite as conspicuous as that of the more recently gathered, and the discrepancy on the yield of coumarin was due to the dropping of surface crystals.

Coumarin sublimes at about a temperature of 225°. It first melts, and after the water of crystallization is driven off, the crystals are made to reform on a cool surface. This statement of the temperature does not seem to agree with that made by other observers; but, after repeated trials, I failed to effect sublimation at a lower degree.

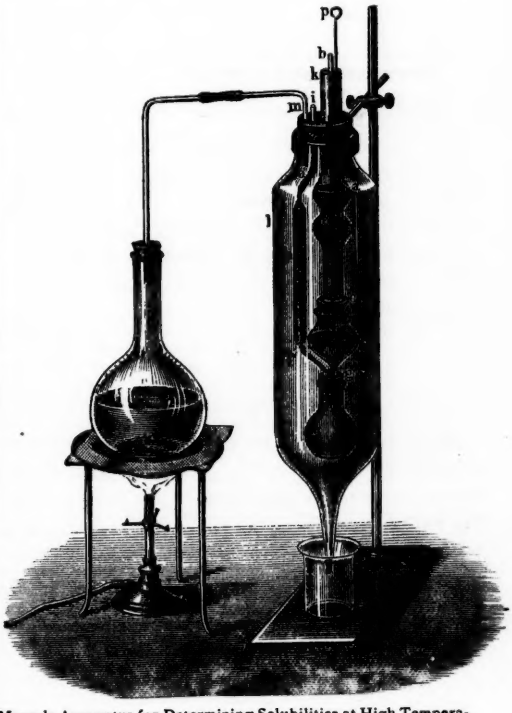
Coumarin has a pungent, slightly bitter taste, is partially soluble in the saliva, and when swallowed in small quantities causes a glow of heat in the stomach. In five-grain doses, it quickens the pulse and causes fulness in the head.

Experiments for the production of coumarin from Liatris point to the fact that it is formed in the process of ripening of the plant, and that it exists in exceedingly small quantities before maturity. Several attempts to procure coumarin by dry distillation of the leaves failed, although it is very likely that it can be procured in this way when a proper process has been devised.

Determination of the Solubility of Substances at High Temperatures.

FOR the determination of the exact solubility of substances at high temperatures, the following apparatus has been devised by Victor Meyer. Its object is to bring together the substance and the proper solvent; to maintain them at a predetermined fixed temperature for some time, and to filter an aliquot part thereof into a small flask for the determination of the proportion of solvent and substance contained therein, the whole operation being performed within an atmosphere raised to the proper temperature.

A suitable quantity of the solvent, together with an excess of the substance having previously been heated to the desired temperature, the mixture of solution and undissolved substance is transferred to the bulb-tube *a*, which is previously connected with the other parts of the apparatus as shown in the cut. The lower end of the tube is closed by



Meyer's Apparatus for Determining Solubilities at High Temperatures.

a rubber stopper (not shown in the cut), which is perforated by a hole closed by the end of a glass rod *b*. The end of the tube passes through a rubber stopper in the neck of a pear-shaped funnel *f*, within which is placed a dry filter. The funnel is connected with the small flask *n*. *p* is a thick silver or platinum wire, spirally twisted below, by means of which the solvent and substance may be agitated. From the small flask *n* projects a chloride of calcium tube *h*, filled with fragments of this salt, which tube may be omitted in all cases where a somewhat considerable amount of solution is collected in the flask, as the amount of water lost by evaporation is comparatively small. Before the experiment, the flask *n* is weighed together with the chloride of calcium tube. The connections are then made, as shown in the cut, and the whole of the apparatus connected with the large rubber stopper *m* is now inserted into the receptacle *l*. Water, or some other liquid furnishing the

proper temperature when boiling, is heated in the flask, and the vapor of the liquid allowed to pass through the apparatus for about fifteen minutes, any condensed liquid being caught by the beaker placed below. The solvent and substance having repeatedly been agitated with the wire *p*, a suitable quantity of the solution is finally allowed, by slightly disengaging the glass rod *b*, to flow into the filter *f*, and thence into the flask *n*. When sufficient solution has passed into the latter, the current of steam is interrupted, the apparatus taken apart, and the flask *n* with the chloride of calcium tube, after being thoroughly dried outside, weighed. The contents of the flask are then rinsed into a capsule, and the solid contents determined by evaporation to dryness.

[Original Communication.]

Iodoform.

BY GEORGE RICHARD BELL, PH.G.*

After describing the properties and history of iodoform, the author reviews the different processes proposed for its preparation as follows:

1. Cornélis and Gille,† of Liège, give a method of obtaining iodoform by adding to an alcoholic solution of iodide of potassium, heated to 104° F., hypochlorite of calcium in successive portions, stirring after each addition until the liquid no longer assumes a dark-red color on the addition of a fresh portion of hypochlorite of calcium (which is a sign that the process is completed). It is then allowed to cool, when the iodoform and iodate of calcium crystallize out; the mass of crystals are then treated with boiling alcohol of 90 per cent, which dissolves only the iodoform which is largely deposited on the cooling of the alcohol.

2. Bouchardat,‡ of Paris, recommends the following process: Put 100 parts of iodine in a comparatively long-necked flask or matrass, add 100 parts of bicarbonate of potassium, 1,200 parts of distilled water, and 250 parts of alcohol, insert a cork through which passes a long glass tube, heat in a water bath, not too quickly, to about 176° F. and add after decoloration of the liquid 25 parts of iodine; then add 20 and afterwards 10 parts of iodine, waiting with each addition till the liquid has lost its brown color.

If iodine should happen to be a little in excess, add cautiously some solution of potassa until decolorized, which shows completion of the process.

Now pour the liquid into a porcelain dish, cover and let stand twenty-four hours, throw on a filter and wash the iodoform with cold distilled water.

The iodoform which has separated is now spread on folds of bibulous paper and dried in the open air. Hager recommends to then evaporate the filtrate to dryness, calcine with charcoal and extract the iodide of potassium with diluted alcohol. As this is quite troublesome to do, Wilder recommends to concentrate the filtrate by evaporation and decompose the iodide and iodate of potassium with nitric acid in excess, whereby iodine is precipitated as a fine black powder and washed with water.

As to the yield, Hager states the highest obtained by him to be 35 per cent. Wilder did not succeed in getting more than 28 per cent, the regained iodine amounting to 62 per cent, thus leaving 10 per cent of iodine to be accounted for, which he thinks is partly due to the formation of iodide of ethyl, but thinks 10 per cent is entirely too much and probably to be ascribed to the small quantities he operated upon.

3. Mr. Filhol§ recommends the following process: Put into a matrass or flask similar to the one used in Bouchardat's process, a solution of 200 parts of crystallized carbonate of sodium and 1,000 parts of distilled water, and add 100 parts of alcohol, heat in a water-bath from 140 to 160° F., then gradually add 100 parts of iodine, about 10 parts at a time.

When the liquid has become colorless, remove the flask from the water-bath and allow to cool three or four hours, then pour out on a filter; return the filtrate to the flask, add 200 parts of carbonate of sodium, 100 parts of alcohol, heat to 160° F., and pass a slow current of chlorine gas through the mixture as long as iodine is separated, continuing until the brown liquid is again decolorized. A small excess of chlorine is of no consequence (Hager states that for every 100 parts of iodine it requires the chlorine which can be evolved from about 200 parts of hydrochloric acid by means of manganese dioxide). Let the flask stand twenty-four hours, then throw the contents on a filter and examine the filtrate with chlorine water to see whether it still contains an appreciable amount of iodine compounds, then if necessary subject the filtrate to a second treatment of chlorine gas, adding previously only 20 parts of carbonate of sodium and 10 parts of alcohol. Collect the iodoform after twenty-four hours. The filtrate may be concentrated and decomposed by excess of nitric acid, according to the method recommended in Bouchardat's process.

The collected crystals of iodoform are now well washed with the smallest quantity of cold distilled water, spread out on pieces of bibulous paper and dried in the open air.

Respecting the yield, Hager says that with the utmost accuracy he did not obtain higher than 72% in two different operations he made. Wilder succeeded in getting 42% and 53%, the regained iodine amounting to 40% and 35%, thus leaving 18% and 12% unaccounted for. He makes the same remarks in regard to the iodine loss as he did in Bouchardat's process, which was that of working with too small quantities, and thinks working with proportionally larger quantities the loss will be greatly less.

I tried the following experiments to test the different methods that had been proposed for the manufacture of iodoform:

Experiment No. 1.—Bouchardat's process, as mentioned before. I used a round-bottomed flask, into the neck of which I inserted a cork through which was passed a long glass tube (three-eighths of an inch in diameter and three feet long) which acted as an inverted condenser. The flask was placed in a water-bath and supported so that the tube was held in an upright position, thus condensing all the liquid volatilized and allowing it to run back in the flask again.

I placed in the flask 5 grams of iodine, 5 grams of crystallized bicarbonate of potassium, 60 *cc.* of water, and 12.5 grams of alcohol (Graves' best 95%) and heated in a water-bath, between 60° and 80° C. (140° to 176° F.), till the color had disappeared, when 1.25 grams of iodine was again added and the flask heated until the color had disappeared a second time, when I added one gram of iodine and heated until it was decolorized. I then added 5 grams of iodine and again heated until decolorized. After the third addition of 1 iodine (or 1 gram lot) I found the crystallized bicarbonate of potassium used insufficient to decolorize the solution, so I added more of this salt small portions at a time), until there had been added 3.848 grams, which completely decolorized the mixture.

After the last portion of iodine that had been added was decolorized, the flask was placed aside to cool and to allow the iodoform to separate, when the contents of the flask were thrown on a filter, to separate the iodoform from the mother liquor. The iodoform was then washed with a small quantity of cold distilled water, placed in folds of bibulous paper and allowed to dry, it was then weighed and found to amount to 0.850 gram. The product was of a light lemon color and very distinctly crystalline.

Although Bouchardat does not speak of treating the mother liquor for a further separation of iodoform, I passed a stream of chlorine gas through the mother liquor (as recommended in Filhol's process), after the addition of 5 grams of bicarbonate of potassium and 12.5 *cc.* of alcohol, which resulted, not in the separation of iodoform, but in the liberation of violet vapors of iodine; upon adding to the liquid in the flask a small quantity of solution of potassa

* Abstract of a Thesis presented to the Massachusetts College of Pharmacy.
† *Journ. de Pharm.* [3]. xxii., 196, 361.
‡ *Journ. de Pharm.* [3]. xxiii., 1.
§ *Journ. de Pharm.*, vii., 267.

there was an instantaneous production of a second quantity of iodoform, which was separated by filtration, washed, dried, and weighed. It amounted to 0.489 grams. The total amount of iodoform obtained by both separations was 1.339 grams or 17.27%. No attempt was made to obtain the iodine from the mother liquor, for reasons that will be mentioned below.

Experiment No. 2.—Filhol's process (as described above). I placed in a flask arranged as in the preceding experiment 2 grams of iodine, 10 grams of crystallized carbonate of sodium, 50 *cc.* of water, and 5 grams of alcohol and heated in a water-bath (between 140° and 160° F.) till the liquid was decolorized, when I added 2 grams more of iodine and again heated till decolorized. I then added 1 gram of iodine and continued heating until decolorized, never allowing the temperature to rise above 160° F. The flask was then removed from the water-bath and allowed to cool, when a large quantity of iodoform of a deep-yellow cast crystallized out.

The contents of the flask were then thrown upon a filter, the iodoform washed with a small quantity of distilled water to free it from the mother liquor, and placed on folds of bibulous paper in a warm atmosphere to dry. The dry product weighed 0.834 grams.

The filtrate from this (the first separation), I returned to the flask and added 10 grams of crystallized carbonate of sodium, 0.5 grams of alcohol and heated to 160° F., and passed a slow current of chlorine gas through the mixture, which at first assumed a brown color, then was decolorized with a separation of iodoform. The current of gas was then stopped, the flask removed from the water-bath, and allowed to cool.

The contents of the flask were then thrown upon a filter, washed and allowed to dry. The precipitate before washing was very bulky and of a very light color (almost white), due to the presence of iodate of sodium, which had separated in a non-crystalline condition. The dry product from this (the second separation) weighed 0.456 grams. I returned the filtrate from the second separation to the flask and added 5 grams of alcohol, 1 gram of crystallized carbonate of sodium, heated to about 150° F., and passed a current of chlorine gas through the mixture, which only caused a liberation of iodine vapors; whereupon I added 1 gram of crystallized carbonate of sodium and 5 grams of alcohol, still continuing the current of gas. No change having taken place in the appearance of the liquid, I added a small piece of soda, about 0.5 gram; the liquid then became colorless and a separation of iodoform took place. The current of gas was now stopped, the flask removed from the water-bath, allowed to cool, and the contents thrown on a filter and washed. The dry product weighed 0.136 grams. The amount of iodoform obtained from the three separations was 1.426 grams, or 28.5%.

Experiment No. 3.—Filhol's process. This experiment is virtually a repetition of Experiment No. 2, with the exception of using three times the quantity. I placed in a flask a mixture of 30 grams of crystallized carbonate of sodium, 150 *cc.* of water, 15 grams of alcohol (95%), and 15 grams of iodine, heated in a water-bath, between 140° and 160° F. till decolorized, when iodoform was separated of a lemon-yellow color, which, when filtered, washed, dried, weighed 2.914 grams. I returned the filtrate to the flask, added 30 grams of crystallized carbonate of sodium, 15 grams of alcohol, and returned the flask to the water-bath and heated to 150° F., and passed a current of chlorine gas through the mixture, which, instead of permanently decolorizing the solution, turned it almost colorless, and then changed it to a dark-brown color, whereupon I added 15 *cc.* of solution of potassa (U. S. P.), and continued the current of chlorine gas. The solution became colorless, with a separation of iodoform in a brownish and apparently impure condition (or, possibly, in an amorphous condition). Upon recrystallizing this from alcohol, the iodoform separated in bright-yellow crystals. The product, when washed and dried, weighed 1.671 grams.

The filtrate from the second separation was returned to the flask, 3 grams of crystallized carbonate of sodium and 1.5 grams of alcohol added, the flask placed on the water-bath, heated to 150° F., and a current of chlorine gas passed through, which caused a third separation of iodoform, which was filtered while hot, to separate the iodoform from the iodate of sodium, which is much more soluble in the warm liquid than in a cold. The iodate of sodium separated in fine needle-shaped crystals; the iodoform, when dry, weighed 0.868 grams. The total amount of iodoform obtained from the three separations was 5.453 grams, or 36.35%.

Experiment No. 4.—This experiment was simply a repetition of Filhol's process, as described above, with this difference, that I added to the deodorized alcohol used 1 part of amylic alcohol in 5 parts of alcohol; the iodoform obtained was of a deep-yellow color and of a very disagreeable odor, similar to that of commercial iodoform.

Experiment No. 5.—Cornélis and Gillé process. The results obtained with this* were so unsatisfactory that I did not save the product. Although the amount of material taken for the experiment was as large as that taken for the other experiments, the yield was very small and of an inferior appearance.

I found the other processes so much superior to this one that I did not think it worth while to repeat it.

CRITICISMS.

Experiment No. 1.—Bouchardat's process. This process is generally recommended as the easiest to work by; in one respect it is, namely, you are not obliged by it to work over your filtrates for additional separations of iodoform by chlorine gas, as in Filhol's process, but it is an objectionable process for the following reasons:

1. The bicarbonate of potassium used is more expensive than the carbonate of sodium used in Filhol's process.
2. It is a slower process than Filhol's, taking more time to complete the reactions.
3. The yield is not nearly so great as in Filhol's.

Bouchardat says nothing about treating the second filtrate for an additional separation of iodoform, which I found possible to do, by passing a current of chlorine gas after adding an additional quantity of bicarbonate of potassium, alcohol, and a small quantity of solution of potassa, which shows that it is possible to obtain more iodoform from the amount of iodine used than by following Bouchardat's own directions. But, even if the second filtrate was treated with chlorine gas, the process would be more expensive than Filhol's, and the yield not so great.

Experiment No. 2.—Filhol's process I consider by far the most advantageous one to work by, for the following reasons:

1. The yield is greater than by any of the processes I tried.
2. It is cheaper.
3. It is a quicker process to work by.
4. The crystals obtained were much handsomer than by the other processes.

For those who wish to obtain an almost odorless iodoform (which they can easily do by using pure materials), Filhol's process is to be recommended, the product having only a faint saffron-like odor.

Experiment No. 5.—The object of this experiment was to find out whether the presence of amylic alcohol would cause the iodoform formed to have a disagreeable odor, in which respect it was successful, the product having a very disagreeable odor, closely resembling that of the commercial article, and, when dissolved in alcohol, it formed a reddish-colored solution resembling that which I obtained by dissolving commercial iodoform exposed to the sunlight.

No attempt was made to recover the iodine from the mother liquors, because the amount obtained was too small to work to advantage, also because the experiments were tried solely to find out which process would be the best as regards quality and yield for the dispensing pharmacist to employ in making iodoform for his own use.

It would, of course, pay to save the mother liquors until enough was obtained to make it an object to extract the iodine contained in them.

*See *U. S. Dispens.*, 14th ed., p. 511.

[Original Communication.]

Extract of Malt.

BY THOMAS T. GOODALE, PH.G.*

In preparing extract of malt, cleanliness is of primary importance. The vessels should be thoroughly washed in some alkaline solutions, such as solution of soda or potash, to prevent any substance from adhering to them, and when not in use, should be filled with lime water. If these precautions are neglected, acetification is sure to follow, and the preparation is spoiled. Care must also be taken that the malt be fresh, as it sours and becomes unfit for use if it has been crushed more than three or four days. The grain must be reduced to a moderately fine state, and the best mode is that which crushes it and loosens the husk from the fleshy part without separating the two. Each shell then forms a filter through which the clear liquor percolates, leaving behind any matter which might be mechanically taken up. When ground in a mill, the grain is so disintegrated that it is apt to set during the process of extraction, and form a mucilaginous magma which retains much of the liquor. This cannot be removed except by repeated washings; a very dilute extract is then produced, which is liable to acetification in the succeeding treatment. In order to obtain a concentrated and bright liquor, the saccharine and amylaceous matters must be extracted with the smallest amount of water, and maintained at a proper degree of heat. The grain will be completely exhausted by one mashing, if successfully conducted. Failure may result from two causes: when a mucilaginous mass is formed in consequence of too elevated a temperature, or when the grain is too fine, the liquor cannot be drawn off freely, and the grain is, therefore, not thoroughly exhausted. If, on the other hand, the temperature is too low, the starch is not converted into dextrin and glucose, but is carried off in suspension. The washing apparatus which was found most convenient, consists of a tub similar to that used by brewers, smaller at the bottom than at the top, with a finely perforated bottom fitted to it. In the side, between the true and false bottoms, is placed a faucet. Fitting into the perforated bottom, and passing through the cover, is a mixer, which is an upright shaft having cross-bars attached, running at right angles to it. A cog-wheel fitted to the top of the shaft, together with a crank, communicates power to it. A cover made of heavy felting was adjusted to the tub. Wood and felt being both non-conductors, any desired temperature can be constantly and perfectly maintained for many hours. Care must be taken to keep the heat of the mash at 160° F., the conversion of starch into dextrin and glucose being best effected at that degree. The freshness, hardness, and dryness of the grain exert an influence on the temperature. When very dry, heat is generated, and the conversion of the starch causes a still greater elevation of the temperature. Boiling water is poured into the tub, and when the heat has fallen to 165° F., the malt is gradually added and thoroughly stirred in. The temperature is now brought to 160° F., and the tub is closely covered to maintain the heat. After stirring for a short time, the mash is allowed to remain at rest for two hours. At the end of this time, the faucet is carefully turned until it is half open. The liquid which flows out should be perfectly bright and clear, and great care should be used to prevent fine particles of grain or any solid matter from passing out. After drawing all the liquid from the tub, a fresh quantity of water heated at 160° F. is sprinkled on the grain, allowed to remain for about an hour, and then drawn off as before. If the grain is not exhausted, this operation must be repeated, but nothing of value will remain after two macerations if they have been properly conducted. When three macerations are necessary, the resulting liquor is so very dilute that acetification is apt to take place before it can be evaporated. In practice, in order to obtain at once a very concentrated extract which should contain all the valuable properties of the grain, the liquid obtained from the first washing is returned to the tub and drawn off in an hour. It is then only necessary to sprinkle on sufficient hot water to force out the liquor held by the grain. If the process has been successful, the extract will be the exact color of the grain used, will have a good head, be finely flavored, and effervesce. When the temperature has been too high, the white head has a tinge of brown, and the color of the extract deepens in exact proportion to any excess of heat. If, on the contrary, the temperature has not been high enough, the liquor is less bright and lively in flavor. When the heat has been very low, the characteristic head will not stand, but flies off immediately, and the liquor will be thick and mucilaginous, and quickly spoil when exposed to the air.

This process differs greatly from Mr. Ebert's, by which the malt is digested for a short time at a temperature of 125° F., and then strained. The liquor obtained contains the diastase. The residue is boiled with fresh water, and strained, and the resulting liquor contains the starch. The two solutions are then mixed and kept at a temperature of 160° F. until the starch is completely changed into grape-sugar, which can be readily ascertained by the iodine test. If a higher degree of heat is used, the diastase of the grain is coagulated, and becomes insoluble and inactive. After straining and filtering, the liquor must be carefully evaporated to the proper consistence. The importance of having the liquor perfectly clear and bright was shown by a series of eight experiments as follows.

Experiment No. 1.—The liquor was pale and not very bright. It was placed in a shallow vessel over a water-bath, and constantly stirred. The albuminous matter which made its appearance during the operation was removed, and the evaporation continued until an extract of the consistence of honey was obtained. It was light-brown in color, with a sweet taste, and had the odor of malt. At the end of two weeks it showed no change, but, in four weeks, a thin crust had made its appearance. After eight weeks, the mass had separated into two distinct layers. The upper one, or crust, which formed about one-third of the whole, was a shade lighter in color than the original extract, and quite tough and pliable. It had a starchy appearance and taste, and, when tested with iodine, gave the blue reaction characteristic of starch. The lower layer was a trifle brighter and more liquid than the original extract, and had an agreeable sweet taste and odor. With iodine, it gave negative results, showing the absence of starch. These layers were separated and again examined in four weeks. The crust had grown somewhat harder, but otherwise remained the same. The lower layer showed no change. The peculiar behavior shown in this case was thought to be due to the separation of the solid and starchy matter of the grain, which had been held in suspension, but which separated when the liquor was evaporated.

Experiments Nos. 2, 3, *and* 4.—These three lots were made in the same manner as No. 1, except that particular care was taken to obtain the liquor perfectly clear and bright. The same process of concentration was strictly followed. When finished, all presented the same appearance, and exactly resembling the lower layer of No. 1, in color, taste, and odor. At the end of eight weeks, all remained light-brown clear extracts. The liquor used in all the preceding experiments was made in a mash-tub.

Experiments Nos. 5 *and* 6.—The liquor used in these experiments was made by Ebert's process. When first strained, it had a pale starchy appearance. Being shaken with paper-pulp and again strained, a perfectly clear, bright color was obtained. The method of evaporation was precisely the same as in previous experiments, and the product resembled in every particular those resulting from Nos. 2, 3, and 4. Examination at the end of eight weeks showed no change.

Experiment No. 7.—The liquor used in this experiment was made by Ebert's process, but was merely strained, not brightened. At the end of eight weeks, the peculiar formation noted in No. 1 had made its appearance. After

* Abstract of a thesis presented to the Massachusetts College of Pharmacy (Boston).

separation, the lower layer remained unchanged, and presented every characteristic of a good extract.

Samples from Nos. 2, 3, 4, 5, and 6 when tested for starch gave negative results.

These experiments, then, proved the correct use of the theory that the peculiar formation noticed when turbid liquors were used, was due to the presence of the solid and starchy matters of the grain, which had passed out in suspension; and that no such formation will take place when the liquor is perfectly clear and bright. Filtering, which is necessary in Ebert's method, renders the process impracticable for large lots, as it is long and tedious.

When made in a mash-tub, the liquor is obtained at once perfectly bright and clear, and is ready to evaporate.

Having obtained a bright liquor, which is necessary, the next step was to find a process by which this liquor could be evaporated in considerable quantities at once, and, at the same time, be made to yield a preparation of a light and uniform color. When evaporated in the ordinary manner in an open pan, good results can be obtained by constant stirring and careful regulation of the heat, provided the quantity of liquor is small. In making large lots, the long-continued heat necessary to reduce so much liquid, produces an extract very dark in color, and sometimes black. This process, is, therefore, impracticable. The vacuum-pan presented itself as a ready solution of the problem, since, by it, a very bright sweet extract can be made, which, in taste, odor, and particularly in color, is all that can be desired. This method, however, was abandoned, as the aim was to find some process which would not require complicated or expensive apparatus. The plan of evaporating in very shallow pans at a low temperature was then tried. The clear liquid was poured into tin pans three-fourths of an inch in depth. These were then placed in a drying closet having a heat 80° to 90° F. The result was but little inferior to what was sought, namely a sweet extract entirely free from any burnt appearance or taste, with an odor resembling fresh bread. The amount of room necessary to carry out this plan led to its abandonment. The fact that the exposure of a very large surface to the air greatly facilitates evaporation, then led to the adoption of an apparatus by which this advantage was secured, and a very low degree of heat could be employed. There being no ceiling to the room in which the experiment was conducted, two wooden uprights, twelve inches wide, which reached nearly to the bottom of a jacketted kettle underneath, were fastened to adjacent floor-beams above. A wooden roller passed from one upright to the other near the bottom, while near the top two rollers were placed parallel to each other. Over these rollers, a band of cloth was passed, forming, as it were, a letter V closed at the top. Power was communicated by means of a crank attached to one of the upper rollers. The kettle being filled with the clear liquor, steam was turned on until the temperature reached 80° to 90° F., and the heat was kept at this point until the operation was finished. The belt was now set in motion, and passing through the liquor, brought the warmer portions to the surface, and carried a considerable part with it as it passed over the rollers. By this method, a large quantity of liquor can be quickly reduced to a small bulk by a low heat, and with little labor. The rapidity of the evaporation is increased by directing a current of air upon the band, and is also, of course, somewhat in proportion to the length of the band and the amount of surface thus exposed. This process yielded a very satisfactory product, very light in color, and free from any burnt taste. When compared with lots made in the ordinary manner, its superiority was very marked. Here, then, was a method which gave good results, required only just sufficient heat to warm the liquor, and was easy in manipulation, while the apparatus was inexpensive and occupied but little room.

A freezing process next presented itself as possessing two great advantages, namely, the entire absence of heat during concentration, which would render the formation of caramel impossible, and the great preservative power of cold. The operation was conducted as follows: The clear liquid, when cold, was frozen in an ordinary ice-cream freezer. The ice-cake was then broken, placed in a strong canvas bag, and firmly pressed in a tincture press. The ice-cake remaining in the press was of a pale straw color. The liquid expressed was again frozen and pressed, and the process continued until a thick syrupy liquid was obtained. This was placed in shallow pans in a warm drying closet, and in about an hour was of the proper consistence. The finished extract was superior in appearance to any which I have yet seen, but the yield was less than in previous experiments, the ice-cake retaining some of the liquor. In subsequent experiments, the ice-cake was divided into several portions; these were put into separate bags, and iron plates placed between them. All were then pressed until the liquor ran white. The ice-cake remaining should be colorless. The liquor was again frozen and again pressed in the same way until the product could no longer be frozen; it was then finished in the drying closet as before. The yield was now satisfactory.

We have then two methods of concentration, each possessing its own special advantages. The first, in which a large evaporating surface is obtained by means of a belt of cloth, recommends itself by the simplicity of the apparatus and its economy in time and labor, while the finished product is of good appearance. The readiness with which this method may be employed in every store, will probably render it the most useful. The second, or freezing process, has the advantage of giving an exceptionally superior product free from all color except that obtained from the grain.

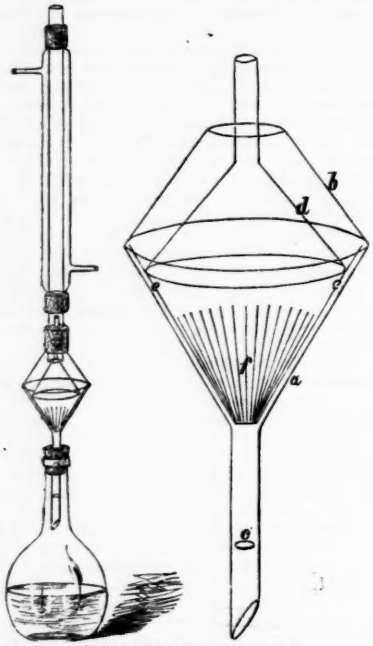
To sum up, in order to prepare a good malt extract, the best malt must be used, a uniform and proper temperature must be maintained during the washing process, care must be used in drawing off the liquor, to prevent the solid matter of the grain from passing out, the exhaustion of the grain must be accomplished with as little water as possible, and the concentration must be effected rapidly at a low heat. By careful attention to these details, an extract will be obtained, which will be handsome in appearance, and contain all the valuable properties of the grain.

The Use of Plaited Filters in Quantitative Work.

Dr. L. Cohn has devised a filtering apparatus which is intended to abbreviate the time required for washing precipitates on filters, by employing a plaited filter in the manner described below. Of course, this is intended to be used only where Bunsen's quick filtering method cannot be employed, owing to the lack of a sufficient pressure of water.

Two funnels, *a*, *b*, of about 65 *mm.* (2⅝ inch.) diameter, one of which (*a*) has a very broad exit tube, are ground upon each other, accurately, with their edges, and the exit tube of *b* is cut off so that the upper orifice has a diameter of 25 *mm.* (one inch). This is closed with a perforated cork carrying the end of the inner tube of an upright condenser. About 25 *mm.* (1 inch) from the end of the outlet of funnel *a*, a small hole, *c*, is filed. Within the funnel are placed, at an angle of 90°, two small glass-rods of about 3 *mm.* diameter, of such length that the funnel *d*, which is afterwards inverted over the filter, rests upon the upper ends of the two tubes. The funnel *a* is next inserted, through a perforated cork, in the neck of a flask held in a retort stand, and the flask fixed firmly against the rim of the funnel *b*, which is connected with the condenser. A well-plaited filter, of such size that it does not come in contact with the edges of the funnel *d*, having previously been introduced, and the precipitate having gradually been transferred to the filter (in which case it is best to use a portion of the liquid originally mixed with the precipitate as a mechanical agent to facilitate the transfer), as soon as the apparatus has been combined in the manner before described, a gentle heat is applied to the flask, which causes some of the water to be volatilized. This is condensed again in the condenser, and trickles constantly upon the precipitate, which thereby becomes rapidly washed.—*Chemiker Zeitung.*

The editor of the *Chemiker Zeitung* doubts the practicability of the apparatus on account of its easy frangibility, its complicated construction, and its want of rapid action. With this verdict we can only partially agree. It is a frail apparatus, but it has the advantage of being a continuous displacement apparatus, which permits an instantaneous detachment of the funnel carrying the filter



Cohn's Filtering Apparatus.

and the condenser, and for this reason appears to us to be applicable for continuous exhaustion even better than for washing precipitates. The hot vapors striking against the lower part of the filter must necessarily increase the solvent power of the water percolating through the filter to such a degree that a sensible loss in the quantity of the precipitate will be incurred. However, the author had in view merely commercial assays, which do not require absolute exactness, and for such a purpose it may answer.

Selections from the Non-officinal Formulary of the Dutch Society for the Advancement of Pharmacy.*

[Continued from page 13.]

Gossypium Hæmostaticum. Styptic cotton.

Solution of chloride of iron (sp. gr. 1480)	2 parts.
Distilled water	12 "
Potash-alum	1 part.
Purified cotton	q. s.

Dissolve the alum in the water, add the solution of chloride of iron, and soak a sufficient amount of purified cotton in the mixture. Dry it at a temperature below 60° C. (140° F.).

Pick it and preserve it in a stoppered bottle.

Gossypium Hæmostaticum et Antisepticum. Styptic and Antiseptic Cotton.

Tannic acid	5
Carbolic acid	4
Alcohol	50
Purified cotton	q. s.

Dissolve the acids in the alcohol, and soak a sufficient amount of purified cotton in the solution. Dry it at a temperature below 60° C. (140° F.).

Pick it and preserve it in a stoppered bottle.

Quiniæ Hydrobromas. Hydrobromate of Quinine.

Potassium bromide	11
Quinine sulphate (offic.)	40
Distilled water	40
Alcohol (95%)	160

Mix the bromide of potassium and sulphate of quinine with the distilled water, warm on the water-bath, add the alcohol, and digest for one hour.

Then filter the warm solution, let the filtrate crystallize, and dry the crystals at a gentle heat.

The salt forms colorless, silky, shining needles, soluble in 46 parts of water, also quite soluble in alcohol. The aqueous solution is fluorescent.

Physostigmiæ Hydrobromas.
Hydrobromate of Physostigmine.
Hydromate of Eserine.

Colorless or slightly colored needles, grouped in stars, unaltered by light, very soluble in water, and yielding therewith a neutral solution. The solution, when applied to the eye, contracts the pupil; when exposed to light, it slowly assumes a red color, which is changed to blue either by warming the solution or by addition of an alkali.

An aqueous solution of the salt should not be rendered cloudy by solution of metatungstic acid, and should yield with solution of potassium-mercuric iodide a precipitate which is soluble in strong alcohol.

When dissolved in glycerin, the salt keeps unaltered for a long time.

Quiniæ et Ureæ Hydrochloras.
Hydrochlorate of Quinine and Urea.

Quinia hydrochlorate	79
Hydrochloric acid (sp. gr. 1050–1054)	70
Urea	12

Dissolve the quinine salt in the acid, filter the solution, add the urea, and warm until everything is dissolved. Set the solution aside in a cold place to crystallize. Collect the crystals on a filter, wash them with a little cold distilled water, and dry them between blotting paper.

Concentrate the mother liquor, so as to obtain, on cooling, a second crop of crystals.

Thus prepared, the salt forms hard, white, columnar, coherent crystals, which are soluble in an equal weight of water, and also in strong alcohol. They melt at 70° C. (158° F.) to a yellowish liquid, and lose 10 per cent of water of crystallizatian.

[Note by CH. R.—I have had considerable experience with this salt, having prepared most of that used at Bellevue Hospital with uniform success on more than one hundred cases within six months, the results being published by Dr. McCoy in the *Medical Record*.—The principal trouble in preparing the salt is the necessity of purifying the urea. Commercial urea is prepared artificially from cyanate of ammonium, but is usually contaminated with unaltered ammonium salts, or with acids. It is absolutely necessary to remove these impurities by repeatedly crystallizing the urea from absolute or at least very strong alcohol. By following the formula given in our last December number, page 368, no difficulty will be encountered.]

Chinoidini Hydrochloras. Hydrochlorate of Quinoidine.

Purified quinoidine	1
Distilled water	4
Dilute hydrochloric acid	q.s

Heat the quinoidine with the distilled water on a water-bath, and add sufficient of the dilute acid to produce a complete solution, taking care that the solution retain a slightly alkaline reaction. Filter, if necessary, evaporate on the water-bath to dryness, powder the residue while still warm, and preserve it in a well-closed vessel.

A yellow, very hygroscopic powder, yielding with water, in all proportions, a clear solution.

*See Title in our January number, page 10, note.

Pilocarpinæ Hydrochloras. Hydrochlorate of Pilocarpine.

Colorless, transparent, scaly crystals, very soluble in water, and having a slightly bitter, somewhat astringent taste.

The aqueous solution yields, with mercuric chloride, a white precipitate. When distilled with solution of soda, it yields a distillate having the odor of trimethylamine.

If an aqueous solution of the salt be rendered alkaline by ammonia and then shaken with chloroform, on evaporating the latter, the free alkaloid is left behind, which is soluble in water, and is rendered green by concentrated sulphuric acid and potassium bichromate.

Strychniæ Hydrochloras. Hydrochlorate of Strychnia.

Shining, needle-shaped crystals, slowly losing their water of crystallization when exposed to the light, and soluble in about 50 parts of water.

Ammonii Hypophosphis. Hypophosphite of Ammonium.

Calcium hypophosphite	17
Ammonium carbonate	14
Distilled water	200
Water of ammonia	2

Dissolve the calcium salt in 100 parts of the distilled water, and the ammonium salt in the rest of the distilled water mixed with the water of ammonia. Filter and mix the two solutions, remove the precipitate by filtration, wash it with water, and evaporate the filtrate and washings, on a water-bath, under constant stirring, to dryness.

The salt is a white, crystalline, very hygroscopic powder, completely soluble in water and in strong alcohol.

The aqueous solution of the salt should not yield a precipitate, insoluble in acetic acid, with test-solutions of oxalate of ammonium, chloride of barium, or acetate of lead (abs. of calcium, sulphuric and phosphoric acids); nor should it effervesce with acids (abs. of carbonate).

The salt should be preserved in small securely closed vials.*

Quiniæ Hypophosphis. Hypophosphite of Quinine.

Calcium hypophosphite	3
Quinine sulphate (offic.)	13
Distilled water	60
Alcohol (95%)	200

Dissolve the calcium salt in the distilled water, and the quinine salt in the alcohol. Filter, and mix the two solutions, let the mixture stand for two hours, occasionally stirring, and filter.

Distil off about one-half of the liquid, and evaporate the remainder, on the water-bath, to the point of crystallization. Collect the crystals, and dry them between blotting paper at about 30° C. (86° F.).

The salt appears in white, needle-shaped crystals, united in groups, soluble in 25 p. of cold, 1.2 p. of boiling water, and in 9 p. of strong alcohol.

The precipitate produced in the aqueous solution by ammonia must be completely soluble in ether. Neither chloride of barium nor acetate of lead should produce a precipitate in the aqueous solution (abs. of sulphuric and phosphoric acids).

Argenti et Sodii Hyposulphis. Hyposulphite of Silver and Sodium.

Silver nitrate	4
Sodium chloride	q. s.
Sodium hyposulphite	13
Distilled water	q. s.
Alcohol (95%)	256

Dissolve the nitrate of silver in 10 parts of distilled water, and add to it a solution of chloride of sodium as long as a precipitate is produced. Collect the precipitate on a filter, and wash it with distilled water until a drop of the wash-water no longer leaves a residue on evaporation. Add the still moist precipitate to a clear solution of the hyposulphite of sodium in 30 parts of distilled water. When the silver salt is dissolved, add the alcohol, and let the mixture stand for a few hours. Then pour off the supernatant clear liquid, collect the crystals in a funnel, the neck of which is closed by a pellet of cotton, wash them with alcohol, and dry them without heat.

The whole manipulation must be performed in a place not accessible to day-light. [Best in a photographic dark-room.]

The salt is a white, or grayish-white, crystalline powder, easily soluble in water, but insoluble in strong alcohol.

The aqueous solution yields, with solution of nitrate of silver, a precipitate which at first has a yellowish-white color, but soon passes to yellowish-red and brownish-black.

The salt must be carefully protected from the light.

Infusum Carnis frigide paratum. Cold-prepared Beef Tea.

Beef, free from fat, and very finely chopped	500
Sodium chloride	4
Distilled water	q. s.
Diluted hydrochloric acid (sp. gr. 1.050)	1

Macerate the beef for one hour with the sodium chloride, the acid, and 500 parts of distilled water, then strain through a cloth, and wash the remaining beef—without pressing—with sufficient distilled water, so that 500 parts of product are obtained.

Ethyl Iodidum. Iodide of Ethyl.

A colorless, clear, neutral liquid of a peculiar odor, boiling at 71–72° C. (160°–161.6° F.), of the sp. gr. 1.946 at 16° C., difficultly soluble in water, but easily soluble in strong alcohol.

On standing for some time, it generally becomes colored by liberated iodine, but may be freed from the latter by shaking with mercury or by rectification.

It should be preserved in completely filled vials in the dark.

Ammonii Iodidum. Iodide of Ammonium.

A white, crystalline powder, soluble in an equal weight of water and in 8 or 9 parts of strong alcohol. When exposed to air it absorbs moisture and becomes yellow.

Amylum Iodatum. Iodized Starch.

Wheat starch	98
Tincture of iodine (1 in 13)	28

Triturate the starch intimately with the tincture of iodine, and dry by exposure to air.

A dark-blue powder containing about 2 per cent of iodine.

Amylum Iodatum Solubile. Soluble Iodide of Starch.

Dextrin	95
Iodine	5
Alcohol	5
Ether	10

Triturate the dextrin with the iodine previously dissolved in the alcohol and ether, and dry by exposure to air.

A dark-blue powder, soluble in water, and containing about 5 per cent of iodine.

Arseni Iodidum. Iodide of Arsenic.

Arsenic, cryst. (metallic)	1
Iodine	5

Rub them separately to powder and mix them intimately. Then sublime the mixture in a glass retort, and collect the crystals which collect in the neck.

The salt appears in purple crystals, soluble in water, alcohol, and ether.

Hydrargyri Iodo-Chloridum. Iodo-Chloride of Mercury.

[Iodetum et Chloretum Hydrargyricum cum Chloreto Hydrargyroso. Hydrargyri Biniodidum et Bichloridum cum Hydrargyri Chorido Miti.—Biniodide and Bichloride of Mercury with Calomel.]

* The original says: "*Bewaar het zout in eene exsiccator-flesch;*" Preserve the salt in a drying-flask. That is, in a vessel which is so arranged, that no moist air can have access to the salt, or which contains substances removing moisture from the air. For instance, pieces of quick-lime may be laid in the bottom of a large glass-stoppered bottle, and the vials containing the salt placed on top of the lime.

(As a substitute for Boutigny's salt :)

Mercury biniodide	45
Mercury bichloride	27
Calomel	47

Triturate the salts together, with the aid of a little alcohol, until they are intimately mixed.

Morphiæ Iodohydrargyras. Iodohydrargyrate of Morphia.

Morphia hydrochlorate	1
Potassium iodide	2
Mercury biniodide	2
Alcohol	20

Dissolve the morphia and potassium salts in the alcohol, then add the mercury salt, and apply a gentle heat until everything is dissolved. Allow to cool, collect the separated salt on a filter, wash it with distilled water, and dry it with a gentle heat.

It forms a yellowish-white, crystalline powder, insoluble (at 15° C.) in water, strong alcohol, ether or chloroform, but soluble in 1,000 parts of boiling water.

Koussinum. Koussin. Kosin.

Needle-shaped, rhombic, yellow crystals, furnishing, on trituration, a white powder. Insoluble in water, difficultly soluble in strong alcohol, but easily soluble in ether, carbon disulphide, chloroform, and sulphuric acid.

The crystals melt at 142° C. (287.6° F.) to a liquid which forms, on cooling, a transparent mass becoming instantly crystalline when brought in contact with a single drop of alcohol.

When heated with sulphuric acid, kosin yields a red solution. The same color is produced by adding to an alcoholic solution of kosin, an alcoholic solution of ferric chloride.

The commercial article is usually in form of a yellowish-white, crystalline powder; but need not, on this account, be rejected.

Lac Ferratum. Iron-Milk.

(Aqua Phosphatis Ferrici Albi.) Milk of White Phosphate of Iron.

Sodium phosphate	27
Solution of chloride of iron (sp. gr. 1.480)	17
Distilled water	1000

Dissolve the sodium phosphate in the distilled water, and gradually pour in the solution of chloride of iron [previously diluted with 3 or 4 volumes of distilled water]. Stir well, collect the precipitate upon a linen strainer, wash it with distilled water until the washings are scarcely rendered turbid by solution of nitrate of silver, and mix the still moist precipitate with sufficient distilled water to produce a volume of 1,000 parts [that is, the above quantities, in grams, are to yield 1 litre of the milk].

It contains 0.25 per cent of iron.

Lac Iodatum. Iodine-Milk.

Cow's milk	30
Tincture of iodine (1 in 13)	1

Warm the milk to 30° C. (86° F.), and add to it, under stirring, the tincture of iodine.

This preparation should only be made when wanted for use.

Bismuthi Lactas. Lactate of Bismuth.

Subnitrate of bismuth	61
Water of ammonia	50
Lactic acid	55
Distilled water	q. s.

Mix the subnitrate of bismuth, in a flask, with the water of ammonia previously diluted with 75 parts of distilled water. Let the mixture stand for one hour, pour off the supernatant liquid, and wash the residue thoroughly with distilled water. To the moist residue add the lactic acid, and evaporate the mixture to dryness on the water-bath.

The product is a white powder, difficultly soluble in water, and insoluble in alcohol.

Mangani Lactas. Lactate of Manganese.

Colorless, or light amethyst-colored, shining crystals of the monoclinic system, or a crystalline powder; unaltered by light, difficultly soluble in cold, readily in boiling water; insoluble in cold, but somewhat soluble in boiling alcohol.

Calcii Lactophosphas. Lactophosphate of Calcium.

White fragments [or a white powder], very soluble in water, somewhat deliquescent, and of a slightly sour taste.

Cetraria Saccharata. Iceland Moss Sugar.

(Lichen Islandicus saccharatus.)

Iceland moss	100
Sugar	100
Water	q. s.

Wash the Iceland moss thoroughly with water, press it, and then boil it for one hour with a sufficient quantity of water. Strain the liquid off, press out the residue, allow the united liquids to become clear by settling, and dissolve in the clear liquid the sugar. Then evaporate on a water-bath, under stirring, until the residue can be reduced to a fine powder.

Preserve this in a well-closed vessel.

Another preparation follows the preceding, under the title:

Lichen Islandicus saccharatus, principio amaro orbatus.

Iceland Moss Sugar, deprived of its Bitter Principle.

Iceland moss	100
Potassium carbonate	q. s.
Sugar	100
Water	q. s.

Mix the Iceland moss with a sufficient quantity of warm water, in every 375 parts of which 1 part of potassium carbonate is dissolved. Let it stand for an hour, then wash the moss several times with cold water, and proceed as in the preceding.

(To be continued.)

Stains and Spots.

[From *The Chemists' and Druggists' Diary* for 1882.]

GENERAL PROTECTION FROM STAINS.

MR. D. M. LAMB, of New York, is reported to have invented a method of treatment which will protect fabrics of all kinds from stains, caused by rain, wine, hard usage, and other things. It consists in the application of some preparation of rubber dissolved in naphtha. It is said that fabrics so prepared will neither shrink, mildew, decay, nor be attacked by moths.—*Chem. and Drug.*, 1880, p. 263.

GENERAL DIRECTIONS.

Pure water, cold or hot or mixed with acids, serves for rinsing goods in order to remove foreign and neutral bodies which cover the color.

Steam softens fatty matters, and thus facilitates their removal by reagents.

Sulphuric acid may be used in certain cases, particularly for brightening and raising greens, reds, yellows, etc.; but it must be diluted with at least one hundred times its weight of water, and more in case of delicate shades.

Muriatic acid is successfully used for removing ink stains and iron mould on a number of colors which it does not attack.

Sulphurous acid is only employed for whitening undyed goods, straw hats, etc., and for removing the stains of certain fruits on silks and woollens.

Sulphurous gas is also used for this purpose, but the liquid acid is safer.

Oxalic acid is used for removing ink and rust stains and remnants of mud stains which do not yield to other detergents. It may also be used for destroying the stains of fruits and astringent juices and old stains of urine. However, its use is limited to white goods, as it attacks fugitive colors, and even light shades of those reputed to be fast. The best method of applying it is to dissolve it in cold or lukewarm water, to let it remain a moment upon the spot, and then to rub it with the fingers.

Citric acid serves to revive and brighten certain colors, especially greens and yellows. Is restores scarlets which

have been turned to a crimson by the action of alkalies. Acetic acid (or tartaric) may be used instead.

Liquid ammonia is the most powerful and useful agent for cleaning silk stuffs and hats and for neutralizing the effects of acids. In this latter case it is often enough to expose the spots to the vapor of ammonia, which makes them disappear entirely. It gives a more violet tone to all colors obtained with cochineal, lac, Brazil wood, and logwood, or topped with cochineal. It does not injure silks, but it sensibly attacks woolen tissues at high temperatures. It is also used for restoring black silks which have been damaged by damp.

Carbonate of soda (crystals) may be used in many cases where ammonia is employed. It is good for silk hats which have been injured by sweat.

Soda and potash (caustic) only serve for white linen, hemp, and cotton goods; for they attack colors and injure the tenacity and flexibility of wool and silk. For the same reason white soap is only used for cleaning white woollen goods.

Mottled soaps suit for cleaning thick tissues of woollen and cotton, such as quilts, which are not submitted to friction. For such tissues, when they do not require much suppleness or softness, the action of the soap may be enhanced by a slight addition of potash.

Soft soap may be usefully employed in solution along with gum or other mucilaginous materials, for cleansing dry goods, and especially self-colored silks. It removes spots more easily than white and mottled soaps do, and injures the colors less. A soap-bath serves for thoroughly cleansing whites and fast colors. It may be employed in washing-machines like the solution of soda crystals, and ofted after a passage through the latter liquid. It is prepared by dissolving thin slices of soap in boiling water, and should be kept in stoneware pans or wooden troughs.

Soap powder is chiefly used in cleansing kid gloves.

Ox gall has the property of dissolving most fatty bodies without injuring the tissues or the colors. It may be used in preference to soap for cleansing woolens; but it cannot be used for very light colors, for it sometimes gives them a pale greenish-yellow shade. It is occasionally mixed with oil of turpentine, alcohol, honey, yolk of egg, clay, etc., and in this state it is used for cleaning silks. (Unmixed galls may also be used with perfect success for dark silks.) To produce a satisfactory effect, the gall should be *very fresh*. A simple method to preserve it consists in tying a strong cord round the neck of the membrane containing the gall, and immersing it in boiling water for some time. When this is done, take it out and dry it in the shade.

Yolk of egg has about the same properties as gall; but it is too costly for general use. It must also be employed as fresh as possible, as it loses its efficacy on growing old. Sometimes it is mixed with an equal volume of turpentine, and employed lukewarm.

Special Directions.—Sugar, Gelatin, Blood and Albumen may be removed by simple washing with water from all kinds of fabrics.

Acids, Vinegar, Orange Juice, etc.—White cottons and linens: Wash with pure water or warm chlorine water. Colored goods or silks: Ammonia diluted according to the fineness of the tissue and the delicacy of the color.

Chrysophanic Acid.—Dr. Balmanno Squire states that the stain can be removed from the skin by the use of benzol. (*C. and D.*, 1879, p. 51.) Dr. Squire states that the only way to remove these stains from cotton goods is to have them properly bleached with chloride of lime. Dr. Walter Fergus finds that this does not remove the stains from linen goods. (*C. and D.*, 1878, p. 167.)

Coffee and milk stains may be removed from silk, woollen, or other fabrics by painting over with glycerin and then washing with a linen rag dipped in luke-warm rain water. It is afterwards pressed on the wrong side with a moderately warm iron as long as it seems damp. The most delicate colors are unaffected by this treatment.

Grease-spots.—For white linen or cotton goods use soap or weak lyes; for colored calicoes, warm soapsuds; for woollens, soapsuds or ammonia; for silks, benzin, ether, magnesia, chalk, yolk of egg with water.

India-rubber Beds, etc.—If stains on India-rubber goods are treated with soda or any alkali, a mark will be left which cannot be removed. The only safe plan is to rub first with a sponge and cold water, and afterwards to use a little soap with a soft toothbrush. This must be applied for a long time with patient brushing. Perhaps a little fine pumice stone might aid the process. (*C. and D.*, 1879, p. 88.)

Nutgall Ink, Rust, Iron-mould.—White cottons and linens: Warm solution of oxalic acid, dilute muriatic acid, followed by granulated tin. Colored cottons and woollens: Repeated washings with a solution of citric acid, if the color is fast. Silks: Do nothing; all attempts only make things worse. Ink stains may be removed from cotton or linen by washing with soap and water before soap is applied. (*C. and D.*, 1878, p. 16.)

A German technical journal states that salts of tin remove iron-mould on linen much more effectually than oxalic acid. (*C. and D.*, 1879, p. 308.)

The *Journal de Pharmacie d'Anvers* recommends pyrophosphate of sodium for the removal of ink stains. This salt does not injure vegetable fibre and yields colorless compounds with the ferric oxide of the ink. It is best to first apply tallow to the ink spot; then wash in a solution of pyrophosphate until both tallow and ink have disappeared.

Stains of red aniline may be removed by moistening the spot with strong alcohol acidulated with nitric acid. Unless the stain is produced by eosine, it disappears without difficulty. Paper is hardly affected by the process; still it is always advisable to make a blank experiment first.

Alizarine Ink.—White cottons and linens: Tartaric acid in solution; the older the stain the more concentrated the solution should be. Colored cottons and woollens and silks: A weak solution of tartaric acid, if the color allows of its use.

Marking-Ink Stains.—A solution of corrosive sublimate will remove "indelible" ink stains. (*C. and D.*, 1878, p. 270.) If the marking-ink contained silver, moisten the stains with tincture of iodine, and then with a solution of potassium cyanide, rinsing thoroughly with plenty of water. A lump of sodium hyposulphite may be rubbed on the marks in place of the cyanide in this process.

Lime, Lye, Alkalies.—White cottons and linens: Wash with cold water. Colored goods and silks: A weak solution of citric acid applied with the tip of the finger to the spot previously moistened with water.

Marble.—Equal quantities of ether and lemon juice will take stains out of marble. Put in a bottle and shake up well; wet the spots with the mixture, and in a few minutes rub with a soft linen cloth till they disappear. (*C. and D.*, 1880, p. 290.)

Paint, Varnish and Resin Stains.—For white or colored cotton and woollen goods, oil of turpentine or benzin, followed by soap-soads. For silk, benzin, ether, soap; hard rubbing is to be avoided.

Scarlet Cloth.—The following are the War Office instructions for removing stains from scarlet cloth. The coat is first to be well beaten and brushed. Then with a clean hard brush a solution of one ounce of salts of sorrel, binoxalate of potassium, in a pint and a half of water is to be applied. Following this, another solution of one ounce of cream of tartar in a pint and a half of cold water is to be applied. The solutions named are sufficient for eight officers' tunics. After cleaning, the coats should be hung in the sun or in a dry place, but not near fire or stoves. *C. and D.*, 1881, p. 40, in the "Book of the Horse" for December, 1880, an acid solution of muriate of tin is recommended for taking stains out of scarlet cloth. (*C. and D.*, 1880, p. 517.)

Stearin, Sperm Candles. For all kinds use ninety-five per cent alcohol.

Tannin, Walnut Shells.—White cottons and linens: Javelle water (liquor sodæ chlorinatæ), warm chlorine water, concentrated solution of tartaric acid. Colored goods or silks: Chlorine water, diluted according to the tissue and

its color, each application to be followed by washing with water.

Tar, Axle Grease.—White cottons and linens: Soap, oil of turpentine, and water, each applied in turns. Colored cottons and woollens: First smear with lard, rub with soap and water, and let it stand for a short time; then wash with oil of turpentine and water alternately. Silks: the same, using benzin instead of turpentine, and dropping the water from a certain height on the under side of the stain; avoid rubbing.

Wine and Fruit Stains.—White cotton or linen: Fumes of burning sulphur, warm chlorine water. Colored cottons or woollens: Wash with tepid soapsuds or ammonia. Silks: the same, with very gentle rubbing.

WASHING LIQUOR.

Ammonia Washing Liquor made and sold in Nottingham forty years ago.

Water	6 galls.
White soap	1 lb.
Pearl ash	2 oz.

Dissolve by boiling, and when cooled to the temperature of new milk add liq. ammoniæ sp. gr. 960 (no quantity mentioned). This was sold retail 4*d.* per pound.

Washing liquor, sold in Hull.

Yellow soap	3 oz.
Water	2 galls.
Liq. ammon. fort	8 oz.

Boil the water with the soap till dissolved, and when cool add the ammonia.

Yorkshire Wash, sold in Norfolk.

Ammonia, strong solution	1 oz.
Common water	1 pint.

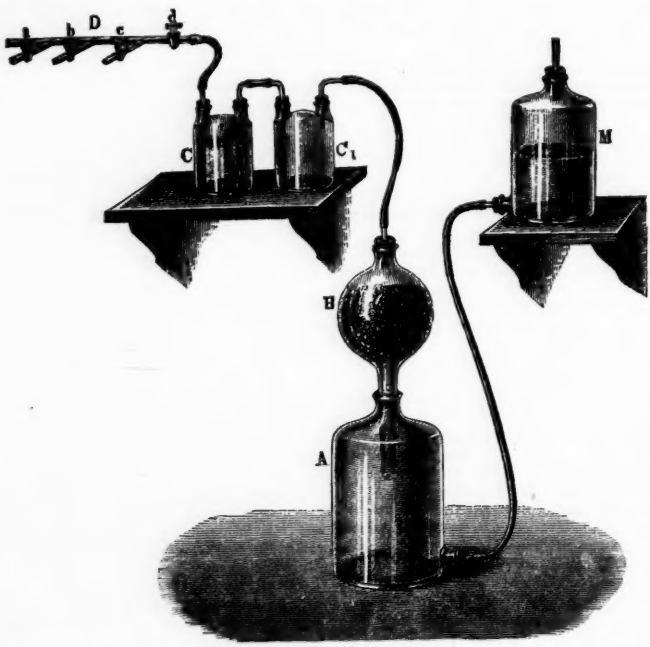
Liqueur Bernhard, a liquid for removing spots and stains is composed of

	PARTS.
Oxgall	10
Potash	5
Water	100

With a little spirit. (*C. and D.*, 1879, p. 383.)

Hydrosulphuric Acid Apparatus.

THE form of apparatus which is recommended for laboratory use by Fresenius, was originally proposed by Brugnatelli, and is used with various modifications in different laboratories. At the University of Marburg, the arrangement is that shown in the cut. The globular vessel *B* contains the ferrous sulphide. The vessels *A* and *M* contain the dilute acid (1 vol. of hydrochloric acid and 2 vols. of water). *M* should only be filled half. The vessel C_1 is empty; *C* contains water for washing the gas. On opening the stop-cock *d*, and afterwards one of the faucets *a*, *b*, *c*, the acid contained in *M* descends into the vessel *A*, and rises upwards into *B* where it comes in contact with the ferrous sulphide. On closing the stop-cocks, the acid is again driven back to *M* by the pressure of the accumulated gas. The solution of ferrous chloride formed, being specifically heavier than the acid, collects at the bottom of the vessel *A*, and, when a fresh supply of acid descends from the reservoir, this finds its way to the top.



Hydrosulphuric Acid Apparatus.

Safety-Paper for Checks, etc.

To prevent the alteration of names, figures, etc., upon documents, N. J. Heckman, of Loughton, England, proposes to add to the glue-water used for sizing, 5 per cent of cyanide of potassium and sulphide of ammonium, and to pass the paper, after sizing, through a dilute solution of sulphate or manganese or copper. On attempting to remove writing made with ordinary nut-gall and iron ink, by means of acids, the writing is immediately changed to blue or red, according to the salt used. If alkalies are used, the paper turns brown.

If the attempt is made to make an erasure, the tinted surface of the paper is removed, and the white interior is exposed.

Paper thus prepared may also serve, to a certain extent, as a reagent.

New Formula for Ink.

THE substances contained in the inks at present in use are all in the main similar, and yet the products differ according to the manner in which the constituents are put together. When bichromate of potassium is caused to act upon the decoction of logwood, there is a formation of a precipitate which is at first black, then brown, and which disappears almost entirely by the action of an excess of bichromate.

The inks at present existing are almost all formed by dissolving in an acid the black lake produced in the reaction above mentioned. The action of the acid has for its object to destroy in part this chromic lake forming a salt of chrome, which dissolves the compound of oxide of chrome and of unaltered hæmateine. There is, therefore, in this operation the loss of a certain proportion of coloring matter.

It has been found possible to avoid this loss, and to produce thus an ink blacker and more concentrated than was formerly done with the same quantity of logwood. Instead of effecting the solution by means of an acid, it is sufficient to correct the alkalinity produced by the bichromate of potassium, and it is dissolved by means of the chrome salt of some weak acid, such as the acetic, hydrochloric [?], boric, etc. The chromic lake remained then unaltered, and after the characters written are dried, it is found in contact with an excess of chromic oxide, which gives it absolute permanence.—ED. DEVILLERS in *Mon. des Prod. Chim.*

Peptone and some of its Forms of Administration.

PEPTONES being frequently prescribed, it appeared to me useful to study the different forms under which they could be administered.

In former investigations, I have shown that peptic peptones differ from pancreatic peptones (see NEW REM., 1880, 302).

The rotary power of peptic peptones is much greater than that of the others. On evaporation, they do not yield crystalline products, which happens in the case of the pancreatine peptones, the latter furnishing considerable quantities of leucine and tyrosine. According to Wurtz, papaïne should furnish the same bodies, being closely related to pancreatin.

Having made a certain number of comparative experiments, in which varying proportions of water, pepsin, and acid were used, the following process was adopted:

One kilogram (2 lbs.) of beef, freed from fatty matters and tendons, is cut very fine, and digested for twelve hours at a temperature of 50° C. (122° F.) in 6 liters (12 quarts) of water, acidified by hydrochloric acid (4 gm. or 60 grains of the acid per liter or quart). The quantity of pepsin to be added, varies according to its activity. In general, about 10 gm. of pepsin, prepared according to my process from the hog's stomach, is sufficient. After the lapse of twelve hours, the mixture is strained, allowed to cool, and then passed through a wetted filter, so as to retain the fatty matters. The solution should not be rendered turbid, or precipitated by nitric acid. It is next exactly neutralized with bicarbonate of sodium, and evaporated to dryness on the water-bath.

One kilogram (2 lbs.) of beef yields, on an average, 250 *gm.* (½ lb.) of dry peptone.

In place of evaporating to dryness, the liquid peptone may be evaporated to a density of 25° B. (= spec. grav. 1.20), when it will contain about 50 per cent of dry peptone.

This form of peptone, which I will name "pepsine-chlorhydric peptone" (*peptone pepsino-chlorhydrique*) may be administered in beef-tea. As it contains a considerable quantity of common salt, it would impart a disagreeable saline taste to syrups, wines, and elixirs.

For this reason, it has occurred to me to "prepare pepsine-*tartaric* peptone," by substituting 15 *gm.* (½ oz.) of tartaric acid for the 4 *gm.* (60 grs.) of hydrochloric acid of the above-cited formula.

As soon as the peptonization is complete, the liquid is filtered as before, and the filtrate divided into two equal portions, one of which is saturated with bicarbonate of potassium. This is then mixed with the reserved portion, and causes the formation and precipitation of cream of tartar. After again filtering, the liquid is concentrated to a syrupy consistence, and allowed to cool. On standing, nearly all the cream of tartar still retained will be deposited. The clear solution is then poured off, and evaporated to dryness on the water-bath.

The "pepsine-tartaric peptone" thus prepared contains only a minute quantity of cream of tartar, and yields a much better tasting preparation (wine, elixir, syrup, etc.) than those containing hydrochloric acid.

The best forms of administration appear to be the following:

1. *Wafer-capsules.* 1 *gm.* (15 grs.) of the dry peptone may easily be administered, and may be preserved unaltered in this form.

2. *Powder in sealed Tubes.* Small glass tubes are charged with 1 *gm.* (15 grs.) of the dry and powdered peptone, and securely closed at each end. When using a dose, the tube is opened, and immersed in the beef-tea, soup, or other vehicle, in which the contents will rapidly dissolve.

3. *Elixir.*

Peptone	5 parts.
Alcohol, 95%	10 "
Frontignan wine*	40 "
Sugar	25 "
Water	20 "

Dissolve the peptone in the water, add the wine and sugar, and filter. A tablespoonful (of 20 *gm.*) contains 1 *gm.* (15 grs.) of the peptone.

4. *Syrup.*

Peptone	5 parts.
Tincture of orange-peel	5 "
Sugar	60 "
Water	30 "

5. *Wine.*

Peptone	5 parts.
Malaga wine	95 "

Frontignan muscatel, in this case, yields a less agreeable product.

6. *Mercuric Peptones.* During the last few years, a compound of peptone with bichloride of mercury has been frequently used for hypodermic injections in the treatment of syphilis. The bichloride is masked by the presence of chloride of sodium in conjunction with the organic matter, so that no precipitation takes place on the addition of an alkali. The combination is of a nature which facilitates rapid absorption, and is entirely non-irritating. Dr. Jos. Michel and Prof. Fournier, both of whom, among others, have employed the solution, never observed any evil results from it.

The solution may be prepared extemporaneously as follows:

Bichloride of mercury	1 part.
Chloride of sodium	2 parts.
Dry peptone	1 part.
Distilled water	q. s.

Triturate the solids together, moisten them with the least possible quantity of distilled water, and dry in vacuo. After drying, the residue is rubbed to powder. It is completely soluble in water.

To prepare a hypodermic injection containing one per cent of bichloride of mercury, the following proportion is required:

Mercuric peptone	4 parts.
Distilled water	96 "

—A. PETIT, in *Répert de Pharm.*, 1881, 213.

* A superior brand of Muscatel wine.

The Assay of Peptones.

PHARMACISTS are frequently asked about the quality of the different peptones, and the means of assaying their value. Perhaps the following results of some investigations made in this direction, may be found of service.

Several methods have been proposed for the assay of these preparations, namely: 1, the specific gravity; 2, precipitation by absolute alcohol; 3, estimation of ash; determinations of nitrogen. But it may be at once said that all these processes were proposed with a sort of haste and feverishness, since their accuracy has neither been studied nor determined by their authors.

Before attempting to assay any peptone quantitatively, it is absolutely necessary to examine it qualitatively. If this preliminary work is omitted, the subsequent assay may be falsified by foreign matters, either added to preserve the preparation, or to add to its nourishing power.

The value of the specific gravity of any peptone is but slight, on account of the occasional presence of gelatin, glucose, or glycerin which may be present.

But, if the specific gravity is a false criterion, by reason of the presence of foreign matters, then the precipitation by absolute alcohol is doubly erroneous.

In the first place, any gelatin present will be thrown down along with the peptone, and estimated as such. And, on the other hand, alcohol of 99% or over dissolves some of the peptone itself.

To prove this, let us take, for example, a solution of peptone free from foreign matters, and containing 25% of pure peptone. On precipitating this with ten times its weight of absolute alcohol, 9.7 parts of the 25 parts of peptone remain in solution. If we reverse the process, and pour the peptone, drop by drop, into absolute alcohol (as it is recommended by Henninger), the quantity of peptone remaining dissolved is 7.4 parts. And, if we add half its weight of ether to the liquid left after the precipitation of the peptone, 5 parts of the latter still remain in solution.

In order to use this method with anything like success, it is therefore, necessary to add to the alcohol half its weight of ether, so as to precipitate as much of the peptone as possible. To the weight of peptone thus found, referred to 100 parts of solution, 5 parts are to be added.

The determination of the ash need not occupy our time, as it is generally rendered faulty by the presence of a large quantity of chloride of sodium.

Next, the assay of the nitrogen may be rendered erroneous by the presence of gelatin.

But, nevertheless, the determination of the nitrogen and the precipitation by alcohol may be made useful processes, provided the peptone has been submitted to a preliminary analysis, which is best performed as follows:

The peptone is saturated, while warm, with sulphate of magnesium. If it contains gelatin, this separates as a pitchy and elastic mass, and may be removed. If this is present, neither alcohol nor specific gravity furnish a criterion, but the quantity of nitrogen must be determined. The amount of nitrogen due to the gelatin, deducted from the weight of the total nitrogen, yields a number which, when multiplied by the constant 6.05,* expresses the total weight of dry and pure peptone.

Peptone, which contains no gelatin, is diluted with twice its volume of water. Four cubic centimeters of this solution are mixed with a solution of iodine containing 0.03 per cent of the latter. If the color becomes brown-red, the peptone contains glucose.† In this case, the determination by alcohol would give a wrong rerult. Recourse must be had to the assay of nitrogen, and the result, multiplied by 6.05, gives the quantity of dry peptone present.

If the solution of peptone contains neither gelatin nor glucose, alcohol may be used with some advantage, so far as to permit a rapid assay, provided the following proportions are observed:

Peptone		10 parts by weight.
Alcohol, absolute	100	" "
Ether	50	" "

Add the alcohol, under stirring, to the peptone, and then add the ether. Let the mixture settle during three hours, decant carefully, and dry the precipitate at 100° C. (212° F.) upon a tared filter. Refer the weight of the dry precipitate to 100 parts of solution, and add 5. The result represents the quantity of dry peptone in the solution.

The peptone may also contain some alcohol or glycerin, but these substances do not interfere with the precipitation by the ether-alcohol. The glycerin may be determined by evaporating the solution at 90° C. (194° F.) in a flat-bottomed capsule to a constant weight, treating the residue with four parts of alcohol, then adding one part of ether, and decanting the liquid, after standing for some time. On evaporation, it will leave behind the glycerin. The capsule is placed in a drying oven until it ceases to lose weight. The latter, deducted from the former (constant) weight, gives the quantity of glycerin present in the peptone.—TH. DEFRESNE, in *Rép. de Ph.*

* Fibrin-peptone contains 16.66 per cent of nitrogen (Henninger.)
Albumen-peptone contains 16.38 per cent of nitrogen (Henninger).
The mean is 16.52; hence 1 gram of nitrogen represents 6.05 *gm.* of peptone.

† We doubt the reliability of this test.—ED. N. R.

Ammoniacal Peptonate of Iron.

THIS is the title given by Jaillet and Quillart to a compound intended to be administered by hypodermic injection, and which is said to produce no abscesses.

Two separate solutions are first prepared, namely:

1. Dry peptone		5 parts.
Distilled water		50 "
2. Ammonium chloride		5 "
Distilled water		50 "

To the solution of peptone add twelve parts of solution of chloride of iron (ferric), spec. grav. 1.260 [containing 27.5 per cent of anhydrous ferric chloride], which must be devoid of free acid. This produces a coagulum, which is dissolved by adding the solution of chloride of ammonium. Finally add

Glycerin	75 parts
Distilled water	sufficient

to produce 200 parts of a mixture which should be rendered faintly alkaline by a few drops of ammonia. The 200 parts of final product are meant to be by measure; if the parts of the ingredients are taken in grams, then the 200 parts are to be cubic centimeters.

The product is a perfectly absorbable solution, containing in each cubic centimeter 0.005 *gm.* ($\frac{1}{14}$ gr.) of metallic iron. It is peculiar in its chemical behavior, as it does not give, even when neutral, a blue precipitate with ferrocyanide of potassium, but this takes place at once if it is acidulated with a few drops of hydrochloric acid.—*Rép. de Pharm.*, 1881, 561.

Enemata of Peptones.*

M. HENNINGER gives the following formula for enemata of peptones: Five hundred grams of lean meat, minced fine, are placed in a glass receiver, on which are poured three litres of water and thirty cubic centimeters of hydrochloric acid, of density 1.15; to this is added two and one-half grams of the pure pepsin of commerce, at the maximum of activity—that is to say, digesting about two hundred times its weight of moist fibrin. It is left to digest during twenty-four hours at a temperature of 45° C. (113° F.) either in a water-bath or on a stove: it is then decanted into a porcelain capsule, brought to the boiling point; and, whilst the liquid boils, an alkaline solution is poured into it (two hundred and fifty grams of carbonate of sodium to one thousand grams of water), until it shows a very slight alkaline reaction. About one hundred and sixty-five to one hundred and seventy cubic centimeters of

* *Pharm. Journ. and Trans.*, 1881, Nov. 12th, from *Paris Médical*, No. 29.

this solution must be added to it. When this result is obtained, the boiling liquid is passed through a fine linen cloth, the insoluble residue being expressed, and this liquid, which amounts to about two and one-half litres (five pints), is reduced in the water-bath to fifteen hundred or eighteen hundred cubic centimeters. Half of it is administered every day in three enemata, adding two hundred grams of white sugar for the twenty-four hours. The whole of the meat is not dissolved; the fat, the tendons, the connective and the elastic tissues form an insoluble residue, amounting to about a third of the meat used.

Quantitative Estimation of Quinine.*

SHORTLY after publishing my paper "On Iodosulphate of Chinoidin as an Excellent Reagent for the Qualitative and Quantitative Determination of Quinine,"† Professor Jörgensen, of Copenhagen, had the kindness to send me a copy of his paper containing a really classical investigation on the composition of the compounds of the cinchona alkaloids with iodine and sulphuric acid.‡

Although I was quite satisfied with the results I had obtained with my reagent, the fact that Professor Jörgensen describes in his paper not less than seven different compounds of quinine with iodine and sulphuric acid, and contends that, besides these, there exists still another series of similar compounds, which he has not further investigated, made me somewhat uncertain about the composition of the quinine-herapathite which I obtained by the reagent mentioned. I therefore sent to Professor Jörgensen a sample of the reagent with the request that he would try it and communicate to me the result. He was so kind as to do so, and in a letter of November 27th, 1876, after mentioning the difficulties in obtaining well-defined compounds of constant composition, he states: "With your reagent on the contrary, to my great surprise, the formation succeeded; even with a minimum of quinine and a great excess of the reagent, I obtained only herapathite. On the first day after receiving your kind assignment, I ascertained the fact in this direction, and the quantitative investigation gave a very satisfactory result. Even five milligrams of quinine could be found again after twenty-four hours in the form of beautiful crystals. Although my great experience of the aspect of the different herapathites enabled me to ascertain at first sight that the crystals obtained consisted of unmixed herapathite, your request that I would ascertain if the composition agreed with my formula, induced me to reply to your question quantitatively."

After communicating to me the details of his analysis, he came to the following results, according with his formula:

$$4C_{20}H_{24}N_2O_2.3SH_2O_4.2HI.I_4$$

	Found.	Calculated.
Total ..... I.,	32.37	32.35
SO_3.,	10.20	10.13
Loosely combined ..... I.,	21.54	21.39

After the communication of these results, he continues: "Consequently I believe I have been able to determine that I never had in my hands a purer herapathite, and that the compound obtained by iodosulphate of chinoidin has accurately the composition of my formula."

If a chemist like Professor Jörgensen, who has made such a thorough investigation of this kind of compounds of the cinchona alkaloids, gives such a corroboration to the value of my reagent, it will not be wondered at that, after I received his valuable letter, I persisted in the use of it and always to my great satisfaction. I was, therefore, much surprised to read in the number of November 26th last of this journal (*Pharm. Journ. and Trans.*, London), on page 441, the paper of Mr. A. Christensen, "The Quantitative Estimation of Quinine as Herapathite," in which he expresses an opinion quite different from that of Professor Jörgensen. I believed that this difference might be explained by quoting the following sentence expressed in my above-mentioned paper of December 11th, 1875: "Although I feel convinced that this process is not one which, even in the hands of inexperienced persons, shall give accurate results in a short time, I have some hope that in the hands of experienced analysts it may prove a satisfactory one;" but I remembered the saying "errare humanum," and therefore accepted the possibility that Mr. Christensen might be right in stating, "quinine compounds are formed richer in iodine than herapathite, unless the solutions are cold and the filtration takes place one hour after precipitation." To try this, I dissolved 0.53 gram of chemically pure and non-effloresced sulphate of quinine in 5.3 grams of alcohol, containing 1.5 per cent of H_2SO_4, and 26.5 grams of pure alcohol of 95 per cent. After adding a slight excess of the reagent, the liquid was heated to boiling, whereby the whole precipitate of herapathite was dissolved During the cooling the herapathite crystallized beautifully, and was collected on a filter after twelve hours' standing. The amount of herapathite was found to be 0.672 gram, which is to be increased by 0.0487 gram, being the correction for the 39 grams of liquid, from which the herapathite had separated. The 0.53 gram of sulphate of quinine had therefore yielded 0.7207 gram of herapathite, representing, according to Jörgensen's formula, 0.3968 gram of pure anhydrous quinine, or 74.86 per cent. According to the formula,

$$2C_{20}H_{24}N_2O_2,H_2SO_4 + 7Aq = 872,$$

100 parts must contain 74.31 per cent. Notwithstanding the percentage 74.86 found by means of herapathite agrees sufficiently with the percentage 74.31, calculated from the formula of the sulphate of quinine, to have confidence in the analysis, the possibility still existed that this coincidence might only be accidental, and that the herapathite contained more iodine. I therefore sent the herapathite to my friend, Dr. A. C. Oudemans, professor of chemistry at the Polytechnic School of Delft, who replied to me as follows: "I have analyzed your herapathite, and found 21.55 per cent of iodine loosely combined. The formula requires 21.7 per cent"

For those who have not studied Professor Jörgensen's elaborate paper, I add that he found that one-third of the iodine contained in the herapathite is in the form of HI, whilst the other two-thirds are in another form, more loosely combined, of which the quantity can easily be found by means of a standard solution of hyposulphite of sodium.

Since my experiments in this direction have been confirmed by such eminent authorities in chemistry, I believe I am justified in maintaining my conviction that the iodosulphate of chinoidin, if well prepared and well applied, is the best reagent actually known, not only for the qualitative, but also for the quantitative estimation of quinine. As an experience of more than six years has led me, although retaining the principle, to make some slight modifications in its application, it may be useful to communicate my actual manipulation.

1. *Preparation of the Iodosulphate of Chinoidin.*—One part of commercial quinoidin is heated on a water-bath with two parts of benzol, whereby the quinoidin is partly dissolved. The cold clear benzol solution is shaken with an excess of weak sulphuric acid, whereby a watery solution of acid sulphate of chinoidin is obtained. After ascertaining in a small part of this solution the amount of amorphous alkaloid contained in it, so that its whole quantity in the solution may be known, the clear solution is poured into a large capsule. For every two parts of amorphous alkaloid contained in the solution, one part of iodine and two parts of iodide of potassium are dissolved in water. This solution is slowly added, under continuous stirring, to the liquid in the capsule, so that no part of it comes into contact with an excess of iodine. By this addition an orange-colored flocculent precipitate is formed of iodosulphate of chinoidin, which, either spontaneously, or by a slight elevation of temperature, collapses into a dark brown-red resinous substance, whilst the supernatant liquor becomes clear and slightly yellow colored. This liquor which,

*By Dr. J. E. DeVrij, *Pharm. Journ. and Trans.*, Jan. 21st, 188

† *Pharm. Journ.*, Dec. 11th, 1875.

‡ Ueber den sogenannten Herapathit und ähnliche Acidperjodide. Von S. M. Jörgensen. *Journal für praktische Chemie*, Band 14 und 15 (1877), S. 213, etc.

if the prescription is strictly followed, must still contain some amorphous alkaloid, as a proof that no excess of iodine has been used, is poured off, and the resinous substance is washed by heating it on a water-bath with distilled water. After washing, the resinous substance is heated on the water-bath till all the water has been evaporated. It is then soft and tenacious at the temperature of the water-bath, but becomes hard and brittle after cooling. One part of the substance is now heated with 6 parts of alcohol of 92 to 95 per cent on a water-bath and is thus dissolved, and the solution allowed to cool. In cooling, a part of the dissolved substance is separated. The clear dark brown-red colored solution is evaporated on a water-bath, and the residue dissolved in 5 parts of cold alcohol. This second solution leaves a small part of insoluble substance. The clear dark brown-red colored solution obtained by the separation of this insoluble matter, either by decantation or filtration, constitutes the reagent which I have now used for more than six years under the name of "iodosulphate of chinoidin," both for the qualitative and quantitative determination of the crystallizable quinine in barks.

2. *Application of the Reagent.*—To determine the quantity of quinine contained in the mixed alkaloids obtained from a cinchona bark, one part of these alkaloids (one gram is a sufficient quantity) is dissolved in twenty parts of alcohol of 92 to 95 per cent, containing 1.5 per cent of H_2SO_4,* to obtain an alcoholic solution of the acid sulphates of the alkaloids, and this solution is diluted with fifty parts of pure alcohol. From this solution the quinine is separated at the ordinary temperature by adding carefully, by means of a pipette, the above mentioned solution of iodosulphate of chinoidin as long as a dark brown-red precipitate of iodosulphate of quinine (herapathite) is formed. As soon as all the quinine has been precipitated, and a slight† excess of the reagent has been added, the liquor acquires an intense yellow color. The beaker (the conical form of beaker, commonly in use, is peculiarly adopted for this purpose containing the liquor with the precipitate is now covered by a watch-glass, and heated till the liquid begins to boil and all the precipitate is dissolved. The beaker is then left to itself, and in cooling, the herapathite is separated in the well-known beautiful crystals. After twelve hours' rest, the beaker is weighed to ascertain the amount of liquid, which is necessary in order to be able to apply later the necessary correction, for although the quinine-herapathite is very slightly soluble in cold alcohol, it is not insoluble.‡

The clear liquid is poured off § as far as possible on a filter, leaving the majority of the crystals in the beaker, which is now weighed again to ascertain the amount of liquid, which is noted down. The few crystals on the filter are now washed down in the beaker, and as much alcohol added as is necessary to re-dissolve all the crystals at the boiling point. The object of this re-dissolving is to be absolutely certain that by surface attraction no trace of iodosulphate of cinchonidine has adhered to the crystals of herapathite, for these traces, if present, will remain dissolved after the re-crystallization. After perfect cooling, the weight of the beaker is ascertained again, the crystals of herapathite carefully collected on a small filter and the empty beaker weighed again. The difference in weight will indicate the amount of liquor which is added to that of the first liquor, and from the sum of this addition the necessary correction is calculated. If the operation is effected at a temperature of 16° C., the weighed quantity of the two combined liquors will indicate the correction if multiplied by 0.125 and divided by 100. If the temperature be lower or higher, the solubility of herapathite at that temperature must be ascertained by experiment, which can be easily performed by a standard solution of hyposulphite of sodium, as 21.58 parts of iodine found by this reagent indicate 100 parts of herapathite. The herapathite collected on the filter is thoroughly washed with a saturated alcoholic solution of pure herapathite,* and after this washing is completed the liquid retained by the crystals is expelled as much as possible by slightly knocking the sides of the funnel. The filter is then taken from the funnel and laid upon blotting paper, often renewed, to take away as quickly as possible the still adhering liquid. As soon as the filter is air-dry, the crystals of herapathite can be completely removed from the filter and dried on a water-bath in one of a couple of large watch glasses closing tightly upon each other, so that the weight of the substance contained in the glass may be taken without the access of the air. If after repeatedly weighing the weight remains constant it is noted down and to it is added the product of the calculated correction. The sum of this addition is the total amount of iodosulphate of quinine obtained from the mixed alkaloids, subjected to the operation, and from this weight the amount of quinine can be calculated by the use of Jörgensen's formula: $4C_{20}H_{24}N_2O_2.3H_2SO_4.2HI.I_4$. According to this formula, one part of herapathite dried at 100° C. represents 0.55055 part of pure anhydrous quinine.

Before concluding, it may be interesting for some readers to be acquainted with the fact that, although by the discovery of Herapath, in 1852, the beautiful compound of quinine with I and H_2SO_4 has been made generally known, it had already been described and therapeutically used by Bouchardat, who prescribed it to scrofulous patients suffering from obstinate fevers. He was, however, not acquainted with its real chemical formula, for he described it (Bouchardat, *Nouveau Formulaire Magistral*, Paris, 1845, p. 261) under the name of "*Iodure d'iodhydrate de quinine.*"

* This quantity is quite sufficient to transform the alkaloids into acid sulphates; for an excess of acid would increase the solubility of the herapathite, as I have stated already in December, 1875.

† If cinchonidine is present in large quantity as, for instance, in the alkaloids obtained from succirubra bark, the estimation of this slight excess requires a great deal of practical experience, which cannot be acquired without having studied the action of the reagent on a solution of pure cinchonidine in the quantity mentioned of pure and acid alcohol. In manipulating the alkaloids of succirubra bark, it often happens that the first drops of the reagent, instead of producing a precipitate of quinine-herapathite form an orange-colored gelatinous precipitate. In this case the further addition of the reagent is stopped and the beaker slightly heated, whereby the precipitate immediately disappears. In rubbing then the sides of the beakers with a glass rod, the quinine-herapathite appears, and then the reagent can be safely added again.

‡ According to the experiments of Professor Jörgensen, 100 parts of the saturated solution of herapathite in alcohol of 90 per cent at a temperature of 16° C., contain 0.15 parts of herapathite.

§ Before pouring off the whole quantity, it is safe to ascertain with a small portion of it if the necessary quantity of the reagent has been added.

* In my laboratory, a washing bottle containing an excess of pure crystallized herapathite in alcohol of 95 per cent is always ready for application.

Analysis of Corn Ergot or Corn Smut (Ustilago Maidis†).

For the past two years, corn smut has been used as a substitute for ergot, and varying reports have been received as to its therapeutic value.

It has long been known that cattle frequently die from eating corn-stalks upon which this smut has been known to exist. With a view of determining the constituents of this substance, and its probable medical virtues, the following analysis has been made.

Proximate Analysis of Corn Smut.

Moisture; volatile at 108–112° C.	8.88
Sand	4.01
Ash	
Soluble in water.	
Chlorine, Cl	0.20
Sulphuric acid, $S.O_3$	0.27
Phosphoric acid, P_2O_5	0.71
Alkalies, partly carbonates	2.68
	3.86
Insoluble in water. Soluble in HCl.	
Lime, CaO	0.07
Magnesia, MgO	0.53

† By Mr. Henry B. Parsons. Report of the United States Commissioner of Agriculture, for 1880, p. 136.

Iron oxide, Fe_2O_3	0.35
Phosphoric acid, P_2O_5	0.25
	1.20

Insoluble in water and acid.

Silica, SiO_2	0.41

Ether extract.

Fixed oil	4.20
Volatile amine body	Traces.

Eighty per cent alcohol extract.

Soluble in water.

Precipitated by ammoniacal lead acetate.

Organic acid, as malic	0.67
Yellow color	0.51

Not precipitated by ammoniacal lead acetate.

Glucose	1.60
Reddish extractive	4.32

Insoluble in water.

Albuminoid matter	0.70
Resin and red-brown color	2.04
	9.84

Aqueous extract.

Albuminoid, coagulated by heat	.70
Gum	.34
Sclerotic acid	5.51
	6.55
Color (yellow) organic acid and extractive	Traces.

Acid extract,

Starch isomers, by titration	12.87

Alkali and hypochlorite extracts.

Albuminoids	12.95
Other dissolved substances	32.67
	45.62

Undissolved residue.

Pure cellulose	2.56
	100.00

The term sclerotic acid is used provisionally; as here determined, this substance was prepared exactly as recommended by Dragendorff for analysis of ergot, and it certainly contained nitrogen. The residue became dark-brown on drying.

It is very probable that among the 32.67 "other dissolved substances" is included a very large proportion, if not all, of the real organic skeleton (corresponding to true cellulose of ordinary plant organs) of the spores. Simple extraction with dilute alkali, even thrice repeated, failed to remove all soluble matters, and the undissolved residue was as black as the original sample.

Labarraque's solution, acting cold, dissolved a considerable amount not removed by alkali, and the remaining well bleached residue had the properties of ordinary cellulose. It is quite likely that it was partly derived from extraneous woody matters in the sample.

Percentage Composition of pure Ash Soluble in Water.

Chlorine, Cl	3.66	
Sulphuric acid, SO_3	4.94	
Phosphoric acid, P_2O_5	12.98	
Alkalies, partly carbonates	48.99	
		70.57

Insoluble in Water—Soluble in HCl.

Lime, CaO	1.28	
Magnesia, MgO	9.69	
Iron oxide, Fe_2O_3	4.57	
Phosphoric acid, P_2O_5	6.40	
		21.94

Insoluble in Water and Acid.

Silica, SiO_2		7.49
		100.00

Of the constituents which have been separated, the following seem to be the most interesting and the most likely to have medicinal activity:

First, the fixed oil. This oil is of an orange-yellow color, peculiar odor, acrid taste, freely soluble in ether, moderately in alcohol, and is, apparently, a glycerin ether. It appears very similar to the oil of ergot, but is found in corn smut in much smaller amount than in ergot, for, while ergot contains 30 per cent, corn smut contains only about 4.2 per cent.

Second, ether also extracts a volatile substance having a peculiar musty or fish-like odor, and a decided alkaline reaction. The amount extracted from one gram of the sample is equivalent to 0.1 *cc.* of one-fifth normal acid.

It will be seen that the amount is very small. Upon distilling fifty grams of corn smut, with water, in presence of five grams of barium hydrate, a strongly-smelling alkaline distillate was obtained, which neutralized 4 *cc.* (approximately) of one-fifth normal acid.

Upon adding a slight excess of hydrochloric acid and evaporating the aqueous distillate to dryness, a small, nearly white residue was obtained. When this was treated with absolute alcohol, a small portion remained undissolved. The filtrate, upon evaporation, weighed 0.0256 gram.

The amount being very small, it was impossible to identify the substance with certainty.

The aqueous solution, when treated with platinic chloride and considerably concentrated, gave feathery crystals totally unlike the octahedral crystals formed by ammonium chloride; hence ammonia was not present.

Another portion of this aqueous solution of hydrochlorate, when treated with the usual alkaloid reagents, gave no precipitates; hence the substance was neither an alkaloid, nor was it trimethylamine.

Third, eighty-per cent alcohol extracts 9.84 per cent of organic matter. The solution, when evaporated and treated with water, is about three-fourths dissolved by cold water, to form an orange-yellow solution which has an acid reaction, and, when evaporated, a peculiar bland taste. It possesses no very characteristic properties. It contains no tannin, and, in fact, seems to be rather indifferent in its chemical properties.

The organic acid forms a soluble barium salt, which yields barium sulphate equivalent to 0.67 per cent of malic acid.

The portion insoluble in water consists of an albuminoid substance, a light-yellow resin, and a red-brown color. The two latter are soluble in ammonia, and the resin is precipitated by a slight excess of hydrochloric acid.

If this alcohol extract be treated with water, and allowed to stand for several days, it decomposes.

Fourth, after the use of ether and alcohol, cold water extracts 6.55 per cent.

The solution has a light-yellow color, a faint acid reaction, and, upon evaporation, leaves a red-brown hygroscopic residue.

During evaporation, a small amount of albuminous matter separates. If this concentrated solution be treated with an equal volume of ninety-per cent alcohol, this albuminous matter separates, together with a small amount of gum. If this precipitate is separated by filtration, and the filtrate again concentrated to a small bulk and treated with a large amount of ninety-per cent alcohol, a flocculent yellowish-white precipitate is produced, which amounts to 5.5 per cent of the corn smut taken. If this precipitate be removed by filtration, and the filtrate concentrated, there will be found a slight residue of yellow color and acid reaction.

The amount of acid is too small for estimation, but it appears to be oxalic acid. The large precipitate caused by excess of alcohol resembles *sclerotic acid* found by Dragendorff in ergot.

When dried, it is red-brown in color. It is tasteless, or nearly so, and contains nitrogen, and when ignited, leaves a considerable ash. It is intended to investigate this further.

Fifth, after treatment with ether, alcohol, and water, the

insoluble residue was boiled for several hours with about 300 *cc.* of water to which had been added 5 *cc.* of concentrated sulphuric acid.

The acid liquid thus formed had a yellow color, and reduced Fehling's solution in proportion equivalent to 12.87 per cent of starch. Corn smut contains no true organized starch; hence it is believed that these starch isomers may prove to be a portion of the easily decomposable cellulose of the corn smut itself.

Sixth, the residue still undissolved by the acid had a black color, and was considerable in amount, apparently equalling more than half the weight of the corn smut originally used. It was treated with a solution containing 5 grams of sodium hydrate in 300 *cc.* of water. A heat below 100° C. was applied for six hours, and then the dark, black liquid was filtered, and left a black residue. This residue was well washed with water, and treated for two days with 300 *cc.* of Labarraque's solution of sodium hypochlorite. By this means, the black residue was perfectly bleached and very greatly diminished in amount. The dark liquid obtained by the use of sodium hydrate, when treated with excess of hydrochloric acid, gave a dark-brown precipitate, which was not further examined.

It is believed that the portion of the corn smut which corresponds to the true fibre of an ordinary plant was dissolved entirely or in greater part by the solutions of acid of soda, and of sodium hypochlorite which were used, and that the residue of cellulose which remained was largely derived from the extraneous woody matters present in the original sample of corn smut.

The substances which seem most likely to have medicinal effect are the fixed oil, the amine-like volatile substance extracted by ether, and the so-called sclerotic acid extracted by water after the use of alcohol. The investigation of the questions would be of considerable interest, and it is hoped that reliable data will soon be furnished.

The Morality of Opium.

HAVING afforded space on several occasions to papers expressing the views of the majority on the question of the habitual use of opium, it may be of interest to place on record the statements of the minority. Dr. George Birdwood, late Professor of Materia Medica, a curator of the Government Economic Museum, writes in the *Times* of London, as follows:

In view of the undiscriminating agitation which is being manufactured all over the country against the Indian opium revenue (amounting to from £7,000,000 to £9,000,000 sterling a year), on the ground of its imputed immorality, I beg the favor of being allowed to place on record the opinion which I have been led, by years of intimate study and observations in Bombay, to form of the effects of the habitual use of opium on the people of the East. I do not propose to enter into the economical questions of the Indian opium revenue or into the political question of our alleged forcing the importation of the drug on the Chinese. I shall confine myself as much as possible to my personal experience of the general effects of *smoking*, *eating*, and *drinking opium* on the Chinese, Mussulmans, and Hindoos of West India.

As regards *opium smoking*, I can, from experience, testify that it is of itself absolutely harmless. I should like those who have been led to believe, on the unscientific observations of others, that it is harmful, to simply try it experimentally for themselves, under proper precautions, of course, against the risk of using the imperfectly prepared *chandu* or "smokable extract" of opium. I feel satisfied that the more thoroughly they test it, the more strongly will they be convinced with me that the smoking of opium is of itself a perfectly innocuous indulgence. I have known cases of desperate suffering, resulting apparently from excess in opium smoking, such as unscientific observers hold up, *in terrorem*, before the British public. But these cases were always of moral imbeciles who were addicted to other forms of depravity, and the opium pipe was merely the last straw laid on their inherently enervated and overstrained backs. Opium has been smoked for generations in China, even within the precincts of the Imperial Palace at Pekin. As far back as 1796, edicts were issued against the practice, but in vain, so deeply were the people already devoted to it at that date. The determined, obstinate instinct of the Chinese people in its favor, paralyzed even the despotic endeavors of the Chinese Government to suppress it; and long before we became entangled in the quarrel between the Chinese and their Government on the subject, the Financial Board at Pekin had advised recognition of the national habit by the imposition of a tax on opium, on the ground that the increased rigor of the laws enforced against its use since the beginning of the century had only tended to increase the bribes offered to officials for their connivance in it. This judicious proposal was rejected by the Chinese Government with a great flourish of moral indignation, and the crusade against opium smoking continued with renewed severity. All the same, the popular custom proved irresistible, and its victory in the end was of incalculable benefit to the Chinese, as it served gradually, wherever opium smoking prevailed, to completely entice them away from the use of their native ardent spirits. This historical fact should never be overlooked by those who have been led by their blind philanthropy to believe that opium smoking is necessarily injurious to the Chinese, and that, therefore, the Indian opium revenue is immoral. No one will deny that, at all events in tropical countries, the effects of excess in ardent spirits are worse than those of opium, and it would be unfortunate, indeed, if, as a consequence of the abolition of the Government manufacture of opium in India, the Chinese were led back to the use of the ardent spirits of their own baneful distillation. It would be the undoing of probably the greatest temperance triumph of any age or country; for I repeat that, of itself, opium smoking is almost as harmless an indulgence as twiddling the thumbs and other silly-looking methods for concentrating the jaded mind in momentary *nirvana*. The mind often seeks a lullquiescence without vacuity, and finds it in any of the strangely infectious ways—opium smoking among the rest. But, it may be asked, What of the opinion of the Chinese Government as to the morality of opium smoking? It is, I believe, partly due, as with other worthy people, to their not distinguishing between the accidental concomitant of a debauched life and the antecedent inducements to it, but chiefly to the fact of official Chinese ideas of morality being founded on an artificial religious system, and not on the national habits of the masses of Chinamen. The scholastic official ideas of morality in China are utterly at variance, as is obvious in regard to opium smoking, at least, with the universal practice of the people. Be that as it may, all I insist on is the downright innocency, in itself, of opium smoking; and that, therefore, so far as we are concerned in its morality, whether judged by a standard based on a deduction from preconceived religious ideas or an induction from national practices, we are as free to introduce opium into China and to raise a revenue from it in India as to export our cotton, iron, and woollen manufactures to France. The habitual eating and drinking of opium are altogether different things from smoking it as a gentle incentive to restorative repose of mind. *Opium taken internally is a powerful and dangerous narcotic stimulant*, but even so it is no worse in the effects produced by excessive use than alcohol. It is, and has been, immemorially used throughout vast regions of the East. It satisfies a natural human craving for some paregoric stuff or other, "banishing sorrow, wrath-allaying, and causing oblivion of all cares;" while its consumption has been further fostered by the religious ban imposed in Asiatic countries on the use of alcoholic spirts. Alcohol acts with doubly destructive force in tropical climates and with awful rapidity, and its victims are a constant danger to others; whereas, the sufferers from the abuse of opium are seldom dangerous to others, and are a nuisance only from lingering so long in a state of harmless dulness on the hands of their relations. Nothing, moreover, is so offensive to respectable Asiatics as the violent excitement caused by wine and ardent

spirits; and opium enables these dignified persons, who dare not break the ecclesiastical law against alcoholic drinks, nor outrage the social feeling against noisy intoxication, to safely satiate their natural craving for something at once stimulating and soothing. The ill effects of the habitual use of opium in excess are developed almost exclusively among those who, by some weakness or injury of brain, or by the unhappy circumstances of their lives, are predisposed to over-indulgence. The habit of destructive excess among them is, in fact, usually to be traced to chronic diarrhœa, chronic cough, chronic fever, and the long religious fasts, alike of Buddhists, Hindoos, and Mussulmans, in which opium is used to allay the pangs of protracted hunger. Besides these unfortunates, the weak-brained, the dissipated rich, and the hopelessly poverty-stricken, are the only sufferers. Sound, hale people, in comfortable circumstances, who lead healthy lives, seldom or never suffer from the habitual use of opium, even in quantities that seem to be excessive. There are few finer people in the world than those of Goojerat, Kattyawar, Cutch, and Central India, and they are all addicted to the habitual use of opium. In Rajpootana, high and low, rich and poor, indulge in it in the most alarming excess, measured by the quantity they take, but as regards the mass of population, with impunity. These Rajpoots are splendid men, well-formed, handsome, and of the most chivalrous and romantic temperament. Their custom is to drink the opium in the form of an emulsion called *Kasumba*. It is prepared and served in a bowl like an enormous pap-bowl, from which it is poured into the joined palms of every visitor to drink of it, and the Rajpoots are always taking the paregoric draughts from morning till night. But they are robust and active, constantly in the open air, and, as a rule, suffer no more from their immoderate potations of *Kasumba* than healthy countryfolk in England from sound ale, or Tartars from Koumis; certainly not so much as "Glasgow bodies" from whiskey, or Londoners from gin. The women in Rajpootana prepare the *Kasumba*, and it will be remembered that in the Odyssey it is Helen who prepares the famous nepenthic drug.

"Meanwhile, with genial joy to warm the soul,
Bright Helen mixed a mirth-inspiring bowl."

In 1809, Rajpootana was thrown into disorder by the contest of the princes for the hand of Krishna Kumari, the beautiful daughter of the Rana of Oodeypore. To stay the fraticidal strife, the heroic maiden mixed a bowl of kasumba, and exclaiming: "This is the marriage foredoomed for me," drank it off at a draught and sank down and died, so restoring peace to the distracted land. I have a strong suspicion that the free use of opium in Rajpootana acts as a preventive of malarious fevers. It is evident, in short, that there are two sides to the question of the morality of the use of even opium itself, and all the facts regarding its real effects should be fully placed in evidence before the public when the relations of the Government of India with its manufacture and exportation are being made the butt of ignorant and prejudiced opposition. Even the eating and drinking of opium appeared to me so little harmful, and the instances of any consequent evil so rare, that all the time I was in India I was an advocate of the use of all stimulants in moderation, and it was only when I returned to England, and saw on all sides of me, and every day, the evil effects of the abuse of alcohol, that I was gradually led to sympathize with those who urge voluntary abstinence from every form of stimulant. If, however, it is impossible to object altogether to stimulants, we can no more object altogether to opium. Its use is merely a question of geography and race, and not of morality in the least. *A fortiori*, there is nothing to be said on moral grounds against opium smoking. If any one will test its effects, he will find that half its soothing and pleasure is derived from the opportunity it affords for abandoning one's self for a few moments to idleness with the pretence of occupation, in preparing the dainty apparatus used by well-to-do connoisseurs in the operation—the elegant lamp, the exquisite damascened pipe, and quaintly chased silver pins, and cleaning and putting them all back again in the drawer of the low japanned table, which is the respectable opium smoker's fire altar and altar of incense in one, from which the smoke goeth up continually. Those who are fond of rolling up their own cigarettes—probably, not composed of tobacco—will understand this. Then, for the rest, there is the supreme satisfaction felt by men of every color, creed, and race, in passing any mild smoke, especially if it be in any sort fragrant, in and out of the mucous passages of their head, which pleasure is quite independent of the positive physiological action that the smoke-stuff itself may possess, while for any narcotic property there may be in the smoke of thoroughly combusted *chandus*—in the ashes, that is, of smokable extract of opium—the subtlest chemical analysis would probably be baffled to find it out. Blowing soap-bubbles itself can, indeed, scarcely be a more ethereal enjoyment than sucking *chandu* smoke into the throat and blowing it out again, through the nose, and sometimes, by finished performers, through the inner corners of the eyes.

Examination of the Root of Berberis Aquifolium—Variety Repens—Oregon Grape Root.*

THIS plant is found in the mountainous regions of Oregon, California, Utah, Colorado, Nevada, and Montana, from which latter section the sample here examined was received.

The roots, as received, were in broken pieces, about a foot in length and one-fourth inch in diameter; they had a brownish exterior layer, underneath which was a bright-yellow layer. The powdered sample has a bright lemon-yellow color and a decidedly bitter taste.

The root is said to be much used in form of decoction for the treatment of what is known as the "mountain fever" among the western miners. By them it is reported to be an efficient tonic and anti-periodic, capable of replacing salts of quinia in the treatment of malarial disorders.

In 1837, a French physician, Piorry,† stated that he preferred a properly-made extract of the root of *Berberis vulgaris* (a closely related plant) to quinia salts in all diseases where "he found the spleen enlarged in a patient suffering from ague, intermittent, or hectic." Some years later, his former pupil, Dr. L. M. Klein, made further experiments in treatment of fevers in Algeria, and he strongly confirmed the statements of Piorry. As the root of *Berberis vulgaris* (the common "barberry" of the Eastern States) is very similar in composition to the root of *Berberis Aquifolium*, variety *repens*, the therapeutic action of the two is likely to be about the same, and the statements based on trials of the one are probably applicable to the other. Be this as it may, the fact remains that recent trials in this country seem to show that the tonic properties of *Berberis Aquifolium* are unquestionable, and eclectic practitioners have long claimed that its antiperiodic virtues were equally well defined and established.

A careful chemical analysis of the powdered roots reveals the presence of two alkaloids, to which, in all probability, can be ascribed the medicinal effects of the roots. None of the other substances were of a character likely to have any decided activity.

The first alkaloid, *berberina*, is the substance to which the yellow color of the root is due; it is freely soluble in alcohol, moderately soluble in water and in chloroform and ether. Its taste is decidedly bitter. It forms sparingly soluble lemon or orange-yellow salts, with sulphuric, hydrochloric, and nitric acids, and salts more freely soluble with acetic, phosphoric, and hypophosphorous acids.

This alkaloid is removed from the plant by water; much more readily, if a little acetic acid is added.

The alkaloid and its salts have been used as a tonic, and as an antiperiodic, and glycerin solutions of the alkaloid are still considerably employed in treatment of ulcerated surfaces.

The second alkaloid is called "*oxyacanthina;*" it is a white, bitter, difficultly crystallizable solid, which changes to

* By MR. HENRY B. PARSONS. Report of the U. S. Commissioner of Agriculture, for 1880, p. 139.
† The *Lancet*, 1872, Dec. 5th, p. 498.

a light-yellow color if it is long exposed to the air in a moist condition. The presence of a little caustic or carbonated alkali seems to intensify this color, and may possibly cause the change. If this alkaloid be treated with dilute nitric acid in excess, and slightly warmed, it gives off nitrous vapors, and is converted partly into a yellowish-red resin-like substance, and a soluble substance much resembling berberina in color, and precipitated by Mayer's solution. It may be possible that this alkaloid is closely related to berberina; a similar action occurs with hydrastina.

There seem to be no statements regarding the medicinal properties of oxyacanthina. As it is easily prepared, the matter might readily be investigated. It may be separated from the mother liquors, after berberina has been crystallized from extracts of *Berberis Aquifolium* or *B. vulgaris*, by adding a very slight excess of sodium carbonate solution with constant stirring. The yellowish precipitate should be allowed to separate; it can then be washed on the filter until nearly free from berberina, dissolved in dilute hydrochloric acid, and again precipitated by careful addition of ammonia. After washing and drying, the substance is moderately pure. It may be further purified by crystallization from alcohol. It cannot be crystallized from chloroform alone.

The other chemical properties of these two alkaloids will be given later in this article.

The yellow alkaloid berberina is geographically very widely distributed, plants containing it having been found growing in Europe, Asia, Africa, and America. It is also found, probably in more natural orders, and in also more distinct plants, than any other alkaloid—possibly caffeina may prove an exception.

Of the natural orders, it has been found in *Ranunculaceæ*, *Anonaceæ*, *Menispermaceæ*, *Berberidaceæ*, *Rutaceæ*, and *Leguminosæ*. The first five of the above natural orders are closely related, and it may prove that the presence of berberina, together with certain other alkaloids, may be of service in the identification and classification of doubtful botanical specimens. Thus it is at present possible to distinguish chemically between the root of *Hydrastis canadensis* (nat. ord. *Ranunculaceæ*), and the root of *Berberis Aquifolium* or *B. vulgaris* (nat. ord. *Berberidaceæ*); for while both plants contain berberina, still this yellow alkaloid is associated in hydrastis with a white alkaloid (hydrastina), which gives quite different chemical reactions from the white alkaloid of berberis (oxyacanthina). A more complete study of this question would be of scientific and practical interest.

The following is a proximate analysis of the roots:

Proximate analysis of the roots of Berberis Aquifolium, variety repens. "Oregon Grape Root."

Moisture		6.08
Ash, soluble in water	1.63	
Ash, insoluble in water	2.08	
		3.71
Crude fibre		23.33
Albuminoids, insoluble in water and alcohol	3.15	
Albuminoids, soluble in alcohol, insoluble in water	1.68	
		4.83
Berberina*		2.35
Oxyacanthina*		2.82
Black substance with oxyacanthina		0.23
Resin, insoluble in ether, soluble in alcohol		1.91
Sugars (traces), organic acids (?), extractives, colors		4.55
Ether extract, chiefly wax		1.36
Gum and yellowish color		5.56
Starch isomers, by titration		18.05
Substances extracted by acid and alkali		25.22
Determined by difference		
		100.00

In the following table are given some of the properties and characteristic reactions of these three alkaloids. It will be seen that the different solubilities of the platinum salts (18) and of the tannate (20) and the strikingly different color reactions, especially with sulphuric and molybdic acids (Frœhde's regent), (22), serve to make the distinction between hydrastina and oxyacanthina comparatively easy and certain. Lack of material and of time prevented further chemical investigation of oxyacanthina.

* The figures of berberina and oxyacanthina are probably a little too low, owing to the sparing solubility of the alkaloids or compounds which were weighed. The error does not probably exceed 0.1 per cent in either case, and is probably least for berberina, which was weighed as platinum salt. The oxyacanthina was weighed as base.

	Properties and Reactions.	Berberina.	Hydrastina.	Oxyacanthina.
		$C_{20}H_{17}O_4$	$C_{22}H_{23}NO_6$ (?)	$C_{16}H_{23}NO_6$ (?). $C_{32}H_{46}N_2O_{11}$ (?).
1	Color	Lemon or orange	Pure white	White; yellowish, on exposure.
2	Taste	Bitter.	Nearly tasteless	Bitter.
3	Water	Moderately soluble	Insoluble	Nearly insoluble.
4	Absolute alcohol	" "	Soluble	Soluble.
5	Com'l 90% alcohol	Soluble	"	30 cold; 1 boiling.
6	Ether	Nearly insoluble	"	125 cold; 4 boiling.
7	Chloroform	Moderately soluble	"	Freely soluble.
8	Benzole	Nearly insoluble	"	Soluble.
9	Ammonia	Soluble	Insoluble	Sparingly soluble.
10	Soda	"	"	Moderately soluble.
11	Sodium carbonate	"	"	Nearly insoluble.
12	Tinct. iodine	Dark-red precipitate	Dark-red precipitate	Dark brown-red precipitate.
13	Iodine in iodide	Nearly black precipitate	Nearly black precipitate	" "
14	Potas. merc. iodide	Yellow precipitate	Yellow precipitate	Yellowish precipitate.
15	Phosphomolybdic acid	Yellow precipitate; soluble in ammonia	Brownish precipitate; not soluble in ammmonia	Brownish prec., insoluble in but turned dark-blue by NH_4OH.
16	Potas. cadmium iodide	Yellow precipitate	White precipitate	White precipitate.
17	Picric acid	Yellow precipitate; insoluble in dil. HCl.	Yellow prec. insoluble in acetic acid.	Yellow " insoluble in acetic acid.
18	Platinum chloride	Yellow precipitate soluble in in HCl	Yellowish precipitate; soluble in HCl.	Yellowish precipitate; insoluble in HCl.
19	Gold chloride	Yellow precip.; insol. in HCl.	Yellow precip.; insol. in HCl.	Orange precip.; insoluble in HCl.
20	Tannic acid	Yellow precipitate; insoluble in HCl or $HC_2H_3O_2$.	Brownish precipitate; soluble in $HC_2H_3O_2$, but insol. in HCl.	Brownish precipitate; insoluble in $HC_2H_3O_2$ and dil. HCl.
21	Conc. sulphuric acid	Yellowish-red, olive-green, brown, olive-brown.	Yellow, purple-brown, green	Brownish-purple, browner, more purple on standing.
22	Sulphuric and molybdic acids	Yellow-brown, olive-green; same warmed.	Deep-green, brick-red, red-brown, dark-chocolate brown.	Purple; fades slowly; becomes yellow, then green.
23	Conc. nitric acid	Orange-red; no effervescence.	Orange-red; effervesces; brown and darker.	Orange-red; effervesces; color permanent.
24	Fused zinc chloride	Yellow; light-brown	Light yellowish-brown	Chocolate-brown.
25	Specific rotatory power.		+153.5 (in excess dilut. HCl).	

The Composition of Tartrate and Salicylate of Chinoline.

MR. A. BERNTHSEN having been requested by Messrs. Hofmann and Schoetensack, of Ludwigshafen on the Rhine (the present representatives of the well-known firm of Saame & Co.) to make an analysis of the tartrate of chinoline prepared by them, found that it did not have the composition which had been assigned to it.

The salt was first recrystallized several times from alcohol, and was obtained in large, apparently rhombic, flat needles, having the chinoline odor, and appearing perfectly homogeneous under the microscope. It contains no water of crystallization; on ignition, it leaves only a trace of a residue, and melts at about 125° C. (a sharp determination is impossible, as the salt begins to soften and loses chinoline before it reaches the melting point).

It was found to contain 61.05 per cent of tartaric acid. This was determined by treating the aqueous solution of the salt with ammonia, and precipitating it, while boiling and under constant stirring, with chloride of calcium. After standing three days, the tartrate of calcium which had separated in crystalline scales was separated by filtration (cold), and determined as lime.

The above result leads to the formula: 3 quinoline + 4 tartaric acid ($3C_9H_7N.4C_4H_6O_6$), which requires 60.8 per cent of acid. This formula was also confirmed by ultimate analysis.

The author recommends, as a very distinctive test for chinoline, to precipitate with a chromate, which produces a very difficultly soluble chromate of chinoline, crystallizing handsomely.

A New Form of Wash-Bottle.

A. E. JOHNSON says that, some few months ago, he devised a form of wash-bottle which he has found to be very effective. The improvement consists in a modification in the form of the blowing-tube, by means of which a continuous jet of water can be obtained for some time after ceasing to blow, and steam and badly-smelling vapors are prevented from entering the mouth.

The blowing tube is made as follows: Bend a piece of glass-tubing, to form the same angle as that of the blowing-tube of an ordinary wash-bottle; then bend one end completely round in a plane at right angles to the plane of the angle previously made, and break off the straight portion of the tube a little way from the bend. Now bend another piece of tubing completely round, and break off one of the arms very near the bend. This last made tube is then put through its hole in the cork of the bottle, and joined by a short piece of India-rubber tubing to the shorter limb of the other tube. The two tubes thus joined are tied together at the top by a piece of string. The cork of the bottle should project some little way in order that the India-rubber tube may be closed at will by pressing it with the thumb against the side of the cork.

When washing with boiling water, etc., close the India-rubber tube with the thumb before commencing to blow, and before ceasing, close it again, in order to prevent steam from getting into the mouth, and also to get a continuous jet.—*Chem. News*, Oct. 28th, 1881.

Gezow's Corn Cure.

THE following formula, which produces a clear, light-green solution, was recommended by M. Gezow, a Russian apothecary, in the *Zeitschrift für Russland:*

Extract of cannabis indica	5 parts.
Salicylic acid	30 "
Collodion	240 "

Mix and dissolve. It is applied with a camel-hair pencil, so as to form a thick coating, for four consecutive nights and mornings. The collodion at once covers and protects the corn from friction. The Indian hemp acts as an anodyne, and the acid disintegrates the corn, so that after a hot bath on the fifth day, it will come out, adhering to the artificial skin of collodion on the toe. This causes no pain, and is said to be very effective.

Examination of "Native Quinine."*

THE sample was received from Western Pennsylvania, where it is said to be used as a substitute for quinia salts. It is said to be taken from pine trees, on which it forms an excrescence. It was a white, soft, almost structureless wood, with fragments of scaly, brown bark, resembling that of pine. It was almost impossible to powder the sample, as it was very spongy and gummy. Taste, at first, gummy, sweetish, then, after a time, quite bitter. Treated with hot water, the mass swells considerably, and forms a "mushy," thick mixture. If an equal volume of alcohol be added, a considerable gum is precipitated, together with the small amount of fibre present. If the liquid be now filtered, and the filtrate evaporated to dryness, a red-brown resin, insoluble in water and quite soft and waxy, will be found, together with a yellowish, bitter glucoside, which gives reactions like those of the *coniferin* found in pine sap. An alcoholic percolate from this "native quinine" has a decided odor like vanilla. This seems to be due to the presence of *vanillin* in small amounts. Vanillin is now artificially made by the oxidation of the coniferin contained in the sap of pine-trees. In this case the oxidation seems to have been effected in the decomposing wood itself. The sample is a good example of what is termed by botanists "a product of retrograde metamorphosis." In other words, it seems to be the result of a diseased condition, whereby the woody fibre of the pine has been almost entirely changed to gum, the coniferin partially oxidized to vanillin, and possibly the resin produced in unusual amount from the turpentine-like substances in the wood. The following determinations have been made:

Resin	68.15
Albuminoids	3.59
Impure coniferin	6.09
Gum, fibre, moisture, ash, by difference	22.17
	100.00

There seem to be no statements regarding the therapeutic value of coniferin, or of this "native quinine." The testimony of competent physicians can only settle this question.

Preparation and Properties of Pure Emetine.

POWDERED ipecac is extracted first with officinal ether, then with petroleum ether, until a drop or two, on evaporation, does not leave any spots. There is a species of ipecac which yields an intensely straw-colored ethereal extract, and which contains an acid crystallizing from chloroform in needles. According to the author, this very species of ipecac appears to contain most emetine. The ether having removed oil and a waxy body, the residuary powder is dried and extracted with alcohol of 86°, without acid. This menstruum extracts coloring matter and a considerable quantity of tannin, turning ferric salts green. The alcohol having been removed, the syrupy residue is mixed with ferric chloride (about 10 to 13 per cent of the original weight of the ipecac), dissolved in a little water until a sample of the extract brought in contact with solid ferric chloride no longer colors the latter green. Powdered sodium carbonate is now added to strong alkaline reaction, and the mass treated with petroleum ether on the water-bath. The emetine dissolves, and on rapidly evaporating the ether on a water-bath—by blowing through a tube a fine current of air through the liquid—the emetine is deposited as a white powder. The extraction by means of hot petroleum ether is repeated until only traces of emetine are taken up. Concentrated solutions of emetine deposit it in 12 hours, on standing in a cool place. Dilute solutions do not deposit it, and it is best separated in this case by blowing air through them for some time, when it will fall down as a white powder. It must be rapidly collected on a filter and dried over sulphuric acid in vacuo. 400 grams of the best kinds of ipecac yielded 3 to 4 grams of

* From the Report of the United States Commissioner of Agriculture for 1880, page 141.

pure emetine (¾ to 1 per cent). It is readily soluble in ether, also easily in chloroform, acetic ether, methylic, and amylic alcohol, carbon disulphide, alcohol of every strength, oil of turpentine, ethereal oils, and also considerably soluble in fixed oils and fats. It is difficultly soluble in cold petroleum ether or benzin, but easily when hot. It requires 1,000 parts of water for solution. By exposure to sun-light it acquires a yellow color, particularly if at the same time exposed to air. Its melting point is between 62° and 65° C. The salts are easily soluble in water, alcohol, fixed oils, and insoluble in ether, petroleum ether, and benzin.—DR. PODWYSSOTZKI, in *Pharm. Zeitschr. f. Russl.* and *Schweiz. Woch. f. Ph.*

The Extraction of Fat from Nux Vomica.*

IN the *Pharmaceutical Journal* of November 26th, 1881, in a paper by Mr. Hallberg [printed in NEW REM., 1881, p. 328], read before the American Pharmaceutical Association, there occurs the following statement:

"A portion of the same nux vomica was exhausted with 'benzin,' which left, upon evaporation, about five per cent of a light greenish-yellow fixed oil, which did not show any presence of alkaloids."

In the 'Year-Book of Pharmacy' for 1875, p. 20, it is stated that Mr. C. Bullock obtained from four ounces of oil, separated from the extract by heating, 10.6 grains of alkaloid.

In the same publication for 1877, p. 255, L. Wolff remarks concerning the treatment of nux vomica by petroleum spirit: "The oil derived from the 'benzin,' exhausted to make sure of not losing any strychnia or brucia that may be contained therein, should be repeatedly shaken with dilute alcohol until the washings fail to betray to the palate the specific bitter taste of their alkaloids; then the washings must be mixed with the extract in the course of evaporation."

Wolff used a petroleum spirit, but Hallberg does not specify the origin of his solvent. I take it, however, without doubt, to be the same petroleum spirit as is generally used in America for such purposes as extraction of fat, etc.

The presence of oil in extract of nux vomica was an objection which induced me about two years ago to try the process of percolation with petroleum spirit; but on shaking the oil thus obtained with water acidulated with dilute sulphuric acid, and adding potash to the acid solution after separation, the quantity of alkaloid precipitated was so large that the process was not adopted.

My experience being, therefore, contrary to that of Mr. Hallberg's, I resolved, on reading his paper, to estimate the amount of alkaloids extracted with the oil by petroleum spirit. With this object in view, I percolated eight ounces of powdered nux vomica with the spirit until exhausted of oil. The product, measuring ten ounces, was shaken repeatedly with water acidulated with sulphuric acid, and the acid solutions were concentrated to a small bulk and precipitated with solution of caustic soda. The precipitate, washed and dried at 100° C., weighed 0.3185 gram. The filtrate and wash-water were shaken with chloroform, and the chloroform solutions evaporated to dryness, the residue (principally brucia), dissolved in acidulated water, and precipitated with soda, weighed .0385 gram.

This gives a total of 0.357 gram of alkaloids from 8 ounces (or 227 grams) of nux vomica, or .157 per cent, a quantity equal to about one-sixth of the total amount of alkaloids contained therein. From this it is evident that petroleum spirit will remove a considerable proportion of strychnia and brucia from nux vomica, and the resulting extract will be correspondingly deficient in active principle. In the above experiment, the nux vomica, although exhausted of oil, continued to yield its alkaloids to petroleum spirit.

I have found, however, that percolation with coal-tar benzol extracts no alkaloids. It cannot, therefore, be the fixed oil which carries the alkaloid into solution, as is sometimes assumed in similar cases.

Should a dry extract be required, care must be taken to shake the solution with acidulated water and to precipitate the alkaloids as above, or to remove them by dilute alcohol, as recommended by Mr. Wolff.

I may add that the hydrocarbon spirit used was a petroleum product (spec. grav. .700).

* By T. Edward Greenish in the *Pharm. Journal and Trans.*, Jan. 14th, 1882.

The Tincal Trade of Asia.

THE *Chemist and Druggist*, of January 14th, says: We have received the following interesting note on the tincal trade as it is carried on in Asia from Mr. Arthur Robottom, whom we have on former occasions introduced to the trade as an enthusiastic apostle of borax, and who is well known as one of the pioneers of the Californian borax trade. "Tincal," we need hardly say, is the native borate of soda, from which a great deal of our supply of refined borax is orginally derived.

Tincal is brought from the heart of Thibet, over the Himalayan Mountains into India by the "Bootus," who are the owners of flocks of sheep which carry it. The tincal is collected from the side of the lakes in September, October, and November, by poor people, who often only get about equal to one penny per day, paid in cowries, for their toil. It is then brought into the villages of Thibet and sold at the bazaars. The owners of the sheep buy it from the small dealers, and put it into saddle-bags, as much as thirty to forty pounds in each bag, or about equal in weight to the animal that is carrying it; some few goats are also employed in this trade. They then start on their wearisome journey, many of the flocks with nothing but tincal. Every driver carries a distaff and bobbins, and, as they travel, they carefully collect every bit of wool that falls from the sheep, or sticks to the thorny bushes, as the sheep come in contact with the bushes that drag their wool off. The wool is spun into yarn or strong thread, and then woven into cloth, which they make into bags. These are covered outside by sheep-skins to prevent the tincal from getting wet, and also to protect the woollen bags from getting torn by the thorny bushes. Frequent deaths of the sheep and goats take place on the road. The flesh is always eaten by the drivers. From eight hundred to a thousand sheep make a drove; the sheep are driven from seven to nine miles per day, and it takes from six to eight weeks for the journey from the starting-point to Moradabad. They travel through a pass of the Himalaya Mountains, about one hundred miles north of Almira. In one part of the pass there is no grass for twenty-five miles. The underwood has to be cut down for the leaves to feed the sheep. Some parts of the pass are fifteen thousand feet above the sea level. The tincal is sold in the bazaars of Moradabad by the Bootus to native dealers, and it is sent from thence to Calcutta. The owners of the sheep take back, on their return journey, salt, rice, sugar, cowrie shells (which pass as coin), and small Birmingham and Sheffield wares. When tincal was so cheap about three years ago, in consequence of the large imports of borax from California, some of the owners of the flocks kept them in the plains, and carried iron stone, packed in the tincal bags, from Ramghur to the Government ironworks at Kumaon, at about one shilling per ton per mile. The tincal is called "swab" in some districts it passes through, but it is generally known under the name of tincal. The adulteration of the tincal commences at Moradabad and other points on the Indian side of the Himalayas; it is sent thence to Calcutta, some good and some mixed with sand and other impurities, and sold by the natives to the European markets, and sent principally to Liverpool or London. When a European merchant goes to a native dealer in Calcutta and makes a purchase of a few hundred bags, great care is taken that all the visible bags contain prime tincal, the price per sack is fixed upon, and as soon as the buyer has left the go-down, many of the bags of good prime tincal are taken away and inferior stock put in their place. The tincal is then shipped, good and bad all

mixed together, and on its arrival the buyer discerns the inferior article and claims arbitration on account of inferior quality. The tincal is analyzed by chemists in London and Liverpool, most of whom differ in the results; two brokers are then fixed on to make the allowance or award, and the result is generally a loss of from two to eight pounds sterling per ton to the owner or shipper. With a view to prevent the sometimes unjust claims, I suggest the following mode which would put a stop, first, to the fraud in India, and secondly, to the fraud in England, which is, that no European firm ship tincal from Calcutta that contains any dust, but to have the whole sifted through sieves of say twenty meshes. The tincal would come to this country perfectly pure; the potters would use it with perfect safety, and they would be able to get a better glaze, making it preferable to borax. The manufacturers of enamelled iron goods prefer it, and, in fact, many of the German enamelled iron makers will use nothing else for glazing, when they can get it pure. Nearly all the consumers in England, Scotland, and other places, would use it with perfect confidence and safety. Before the discovery of boracic acid lagoons in Italy, the bulk of the tincal was sold in London to borax refiners in Amsterdam, the works of which are now all closed. I have received samples within the last six months from a newly discovered deposit in Nepaul, each crystal weighing from one ounce to four ounces, and quite free from dust. If bulk parcels arrive from this new source equal to sample, adulterated tincal will find no sale in India or England, and native dealers will find it to their interest to sell the tincal pure. The new season tincal will be due in Calcutta in December, January, and February.

Ferrated Cod-Liver Oil.

S. DRAISMA VON VALKENBURG, of Leeuwarden (Netherlands), communicates in the *Pharm. Zeitung* (1881, No. 92) the following new method, devised by Prof. Van der Burg.

Sulphate of iron (precipitated by alcohol).	2	parts.
Solution of soda, sp. gr. 1.18.....	3.5	"
Water.....	10	"
Cod-liver oil.....	100	"

Add the soda-solution to the cod-liver oil, mix them intimately, warm the mixture on a water-wath [original does not state exact temperature], and then add the sulphate of iron, dissolved in ten parts of water. Now pass a brisk current of air for some time through the mixture, which will cause the temperature to rise to 85°–90° C. Keep up the current of air and the same temperature continuously until the compound is formed, during which time the mixture will foam considerably, for which reason the vessel containing it should be only half filled. The time required for finishing the preparation depends partly upon the quantity of air, partly upon the bulk of the oil.

During the process, the iron is first converted into hydrated ferrous oxide, which is changed to ferric oxide by the oxygen of the air. The ferric oxide, in statu nascente, combines with the fatty acids to a soluble salt. The other step of the process, namely, the decomposition of the cod-liver oil, goes hand and hand with the former, one being dependent upon the latter. In this manner, a preparation is obtained which becomes perfectly clear on standing, has a dark garnet-red color, and contains about 0.25 per cent of iron. It cannot be said to have an agreeable odor or taste, which appear to be the more disagreeable the lower the percentage of iron. A more palatable mixture is obtained by adding two parts of pure cod-liver oil to three parts of the ferrated. The resulting mixture contains, then, about 0.15 per cent of iron, which quantity will probably be satisfactory to most physicians.

Suppository-Mass.

J. MUELLER, of Breslau, states that he has been formerly in the habit of making suppositories by triturating the cacao butter, in a mortar, thoroughly with a little castor oil, in the cold, and then adding the remedial agent prescribed. As this method, however, consumed much time, he now keeps a ready-made mass, prepared by melting together

Cacao butter.....	6 parts.
Castor oil	1 part.

This mass can be kneaded to a homogeneous mass in the mortar with comparative ease, and may readily be mixed with any substance whatever. The suppositories are best formed by aid of the pill-tile and a little lycopodium, or starch.—*Pharm. Zeit.*, 1881, No. 97.

Chinese Method of Manufacturing Vermilion.*

THERE are three vermilion works in Hong-Kong, the method of manufacture being the same in each. The largest works consume about six thousand bottles of mercury annually, and it was in this one that the following operations were witnessed:

First Step.—A large, very thin iron pan, containing a weighed quantity, about fourteen pounds, of sulphur, is placed over a slow fire, and two-thirds of a bottle of mercury added; as soon as the sulphur begins to melt, the mixture is vigorously stirred with an iron stirrer until it assumes a black pulverulent appearance with some melted sulphur floating on the surface, it is then removed from the fire, the remainder of the bottle of mercury added and the whole well stirred. A little water is now poured over the mass, which rapidly cools it; the pan is immediately emptied, when it is again ready for the next batch. The whole operation does not last more than ten minutes. The resulting black powder is not a definite sulphide, as uncombined mercury can be seen throughout the whole mass; besides, the quantity of sulphur used is much in excess of the amount required for mercuric sulphide.

Second Step.—The black powder obtained in the first step is placed in a semi-hemispherical iron pan, built in with brick, and having a fire-place beneath, covered over with broken pieces of porcelain. These are built up in a loose porous manner, so as to fill another semi-hemispherical iron pan, which is then placed over the fixed one and securely luted with clay, a large stone being placed on the top of it to assist in keeping it in its place. The fire is then lighted and kept up for sixteen hours. The whole is then allowed to cool. When the top pan is removed the vermilion, together with the greater part of the broken porcelain, have a brownish-red and polished appearance, the broken surfaces being somewhat brighter and crystalline.

Third Step.—The sublimed mass obtained in the second step is pounded in a mortar to a coarse powder, and then ground with water between two stones, somewhat after the manner of grinding corn. The resulting semi-fluid mass is transferred to large vats of water, and allowed to settle, the supernatant water removed, and the sediment dried at a gentle heat; when dry, it is again powdered, passed through a sieve and is then fit for the market.

Tinctura Iodi cum Chloral.

COINDET had recommended tincture of iodine as a remedy for struma, and it has been used since then by other physicians, by way of injections, for the purpose of coagulating albumen and retarding putrefaction. Pavesi proposes to increase these effects by adding chloral to the tincture, and afterwards water. He recommends the following formula:

Iodine	2 parts.
Chloral hydrate	3 "
Alcohol	14 "
Water	q.s.

The alcoholic solution may be diluted with water ad libitum. It then forms a golden-yellow liquid of a peculiar, not unpleasant odor, which immediately coagulates albumen, and has hæmostatic, antiseptic, and narcotic properties.—*Allg. Med. Centr. Zeit.* and *Pharm. Zeit. f. Russl.*, 1881, No. 48.

* Paper read before the North British Branch of the Pharm. Society, by H. MACCALLUM. From *Pharm. Journ.*, December 17th, 1881.

Delicate Test-Paper for Ammonia.

If fuchsine is dissolved in water and dilute sulphuric acid be added to the solution, its red color changes to yellowish-brown. Strips of unsized paper dipped in this solution, which should not be too dilute, assume, after drying, a handsome yellow color, resembling turmeric paper.

Gaseous ammonia coming in contact with this paper imparts to the latter a lasting carmine tint. This test-paper is useful for detecting traces of ammonia. The substance suspected to contain it is mixed with slaked lime, in a beaker or test-tube, moistened with a little water, and a strip of the test-paper suspended in the upper portion, the vessel being stoppered or covered. The paper is best used in a dry condition, since it acquires a bluish tint, when moistened, and the transition of this tint to red is not easily noticed. Decomposition of the ammoniacal salts may be hastened by warming the vessel; vapor of water does not color the paper.

When exposed to the air, the test-paper is gradually affected by the moisture contained in it. It should, therefore, be kept in well-stoppered bottles. But even then it does not keep for a long time, and had better be renewed occasionally.—Gustav Krouper in *Pharmac. Post.*, 1882, No. 2.

Iodide (Teriodide) of Arsenic.

Only *one* iodide of arsenic has been known up to the present time, namely the teriodide (AsI_3) which is also used medicinally. There have been numerous methods published for its preparation, but most of them are circumstantial or little calculated to produce a pure product.* Messrs. Eugen Bamburger and Jul. Philipp, who have published the results of a series of studies on triad elements with halogens, found the process of Nicklès to work best. Arsenic and iodine, in equivalent proportions, are heated together with carbon-disulphide in a flask provided with an upright condenser, until the iodine color disappears. The solution is then evaporated to the crystallizing point. By a single recrystallization the product may be obtained pure.

To the properties of teriodide of arsenic, hitherto known, the following are to be added: It is easily soluble in all usual solvents (alcohol, ether, chloroform, benzol, disulphide of carbon); but difficultly soluble in hydrochloric acid. When heated in contact with the air, it takes fire and burns to arsenious acid. The great tendency of the teriodide to take up oxygen, to separate iodine, and generate arsenious acid—which tendency is shown already by the spontaneous loss of a little iodine on keeping the compound, even in the cold—may be nicely shown by heating it to boiling in a bulb-tube, through which a stream of dry oxygen is passed. Combustion ensues, with a fine violet-colored flame, lasting until the compound is completely consumed. If the operation is well conducted, the walls of the bulb are covered with white arsenious acid, while the separated iodine is deposited near the further end of the tube in black prisms.

Though the compound is readily decomposed by oxygen (also by sulphur), yet it shows remarkable resistance toward other reagents. Its natural color is red, but it dissolves in water to a colorless liquid, which undoubtedly contains hydriodic and arsenious acids, and from which it is recovered in its former condition, and without sensible loss of iodine, on evaporating the solution. This resistance to the decomposing action of water, and its stability towards, and slight solubility in hydrochloric acid afford a means of readily preparing the salt by precipitation from its aqueous solution. If a hot solution of arsenious acid in hydrochloric acid be mixed with concentrated solution of iodide of potassium, the teriodide separates as a reddish-yellow crystalline powder, and may be obtained chemically pure by washing it with hydrochloric acid, of spec. grav. 1.120, until a sample of the washings, on evaporation, ceases to leave a residue of chloride of potassium. The solution, on cooling, deposits a further quantity of the salt in darker-colored hexagonal plates. This process affords 85 per cent of the theoretical yield. The missing 15 per cent may be recovered from the filtrate by ether.

Teriodide of arsenic absorbs large quantities of ammoniacal gas, and thereby becomes white. If ammonia be passed through the red-brown solution of the salt in ether or benzol, the solution becomes colorless, and a voluminous, white precipitate is thrown down, which contains 71.87% of iodine (mean of two experiments). The formula: $2AsI_3 + 9NH_3$ requires 71.48%.

If teriodide of arsenic, or a mixture of the components, be heated with alcohol to 150° C. (302° F.), iodide of ethyl is produced. At the same time the arsenious acid is separated in form of small white plates of a silvery lustre.—*Ber. d. Deutsch. Chem. Ges.*, 1881, 2,643.

Vanadium and its Production.

It appears that the compounds of this metal—now of such great importance in the production of aniline blacks, and, indeed, in any other dyeing and printing operations—may be obtained from the slags which accumulate in such quantities at all large iron-works. For a long time, aniline blacks have been produced at Deville entirely with certain slags from the Creusot works, and with excellent results. In 1867, a few calico printers in the neighborhood of Rouen began to try vanadium in very small quantities as a substitute for the sulphide of copper. At that time, the vanadium compounds were very rare, and vanadates with 50 per cent of the metal were sold nearly at the price of gold. Nevertheless, the new agent, on account of its wonderful efficacy, proved decidedly economical in comparison with sulphide of copper, and was found to have other advantages in practice. The metavanadate of ammonium was commonly used, which was obtained at first from certain German works, and afterwards from the Urda Company in Sweden* which sells the pure salt at about 19s. per lb. Another Swedish firm has since reduced the price. Mr. Witz was informed in the beginning of the present year that great quantities of vanadium had been found in France, namely, in the silicates of the alkaline earths remaining from the manufacture of steel by the Thomas and Gilchrist process. The phosphoretted cast-iron contains vanadium, which is oxidized on blowing in air, and remains in the slag. The slags contain, on an average, 1 per cent of metallic vanadium, and by selecting the slags, 2 per cent may be obtained.

On treating the slags with muriatic acid, a solution of a vanadium salt is obtained, which, in spite of the presence of other articles, may be used at once for printing. With 200 parts of muriatic acid at 32° Tw., 100 parts of ground and sifted slags may be perfectly extracted. The powder is stirred up in twice its weight of water, and the acid is added gradually, stirring constantly; a little sulphuretted hydrogen escapes, and the silica separates out as soon as the temperature of 158° F. is reached. Then 600 parts are added. The solution is allowed to stand, filtered, and let deposit a little more silica. The extract of 2 oz. of ground slag is said to be sufficient for 1.750 pints of color. —*The Chemists' Journal.*

Tannin-Soap.

Cocoa-nut oil	18	lbs.
Solution of soda (38° B.)	9	"
Tannic acid	½	"
Alcohol		q.s.
Balsam of Peru	1	oz.
Oil of cinnamon	⅓	"
Oil of cloves	½	"

Saponify the cocoa-nut oil with the solution of soda, then add the tannic acid previously dissolved in alcohol, and add the other ingredients.—*D. Seifenfabrikant.*

* The authors of the paper from which this is an abstract, mention the processes of Meurer, Hautefeuille, Wiggers, Goepel, and Nickles. The process of Jas. F. Babcock (*Proc. Amer. Pharm. Assoc.*, 23, 693; also *Report on Revis. of U. S. Pharm* by Chas. Rice, p. 19) appears to have remained unknown to them.

* Compare New Rem., 1880, page 304.

Pain-Killer.

THE following formula is given by Hager. Some of the ingredients may be left out, or it may be varied in many ways, since most aromatic substances, containing essential oils or pungent constituents, answer the same purpose:

Oil rosemary	2 parts.
" cloves	2 "
" lavender	1 part.
" lemon	1 "
" orange flowers	1 "
" chamomile ("citratum")	1 "
" rue	1 "
" sage	1 "
Camphor	3 parts.
Compound spirit of melissa	10 "
Stronger water of ammonia	10 "
Spirit of peppermint	20 "
Tincture of caramel	4 "
Tincture of capsicum	80 "

Oleum Chamomillæ citratum was formerly regarded as a cheap substitute for the expensive essential oil of chamomile. It is prepared by distilling 1,000 parts of dry chamomile with 2 parts of oil of lemon and a sufficient quantity of water. The resulting product contains about 33.3 per cent of true oil of chamomile.

Spiritus Melissæ Compositus is the Eau (de mélisse) des Carmes of the French, or Karmelitergeist of the German Pharm.

1. *Spiritus Melissæ Co.* (Germ. Pharm.).

Balm leaves	70
Lemon peel	60
Coriander	30
Nutmeg	30
Cinnamon	15
Cloves	15
Alcohol	750
Water	1,250

Comminute the solids, mix them with the alcohol and water, and distil off 1,000 parts.

2. *Alcoolatum Melissæ Co.* (French Pharm.).

Fresh flowering balm (herb)	180 parts.
Lemon peel outer rind.	30 "
Cinnamon, Ceylon	16 "
Cloves	16 "
Nutmeg	16 "
Coriander	8 "
Angelica root	8 "
Alcohol (sp. gr. 0.864)	1,000 "

Comminute the solids, macerate them in the alcohol during four days, then distil.

Saddle-Bags Outfit.

E. J. K., writing to the *Louisville Medical News*, says: Your country subscribers will not think it amiss if one of their number describes his saddle-bags for their benefit. One of my colleagues considers the saddle-bags a nuisance. I differ decidedly with him; I consider my saddle-bags a good comrade. This may be on account of their arrangement. They are an Elliott's patent. Originally these saddle-bags are defective, but after replacing the loose leather strips by solid tin partitions to hold the bottles, it becomes almost perfect. My bags contain twenty-four bottles in three spaces; the fourth space is reserved as a curiosity shop. One space has pepsin, subnitrate of bismuth, calomel, rhubarb, jalap, bromide of potassium, iodide of potassium, and chlorate of potash; another, quinine pills (two-grain), cathartic pills, chloroform, sweet spirit nitre, tincture iron muriate, sulphuric ether, tincture iodine, and quinine; another, fluid extract ergot, fluid extract valerian, fluid extract ipecac, tincture catechu, tincture opium, morphine, Dover's powder, and carbolic acid. I give the medicines as they are arranged in the partitions. The bottles are labelled and the rubber corks also. For the chloroform I use a common cork, as my first (the rubber one) was dissolved.

The remaining space contains a Nélaton's catheter, a hypodermic syringe, some surgeon's silk, scissors, some surgeon's needles, a piece of blue-stone, a spatula, paper, a small vial of oil of mustard for mustard plasters, and an ounce of cinchonidia.

I make a good fever mixture on my trips thus: A teaspoonful of quinia, a tablespoonful of cinchonidia, thirty drops of tincture of iron, and a tumbler of whiskey, providing the house contains whiskey. Almost every house contains turpentine, which is one of the country practitioner's most tried friends, answering as an embrocation, a stimulant poultice, an anthelmintic, a cardiac stimulant, a hemostatic, and what not.

To such of the fraternity as practise among the hills, and whose fees are fifty cents a mile, medicines thrown in, this may not be a bad hint.

Cod-Liver Oil Jelly.

CAN easily be prepared in the following manner:

℞ Cod-liver oil	5	fluid ounces.
Best isinglass	2	drachms.
Sugar (white), powdered,	1½	ounces.
Oil of bitter almonds	4	drops.
" allspice	2	"
" cinnamon (Ceylon)	4	"
Water	1	fluid ounce.

Having placed the cod-liver oil, isinglass, and water in a suitable vessel over a water-bath, apply sufficient heat to melt the isinglass; then add the sugar, the essential oils having been mixed with it by trituration, and remove from the fire, stirring the mixture as it cools until it thickens. When it is cold, a firm jelly will result, which will keep without spoiling for any length of time if put up in corked bottles. The consistence of this jelly is such that it may be taken in water, milk, or wine, without tasting the oil.

The Washing of Bulky Precipitates.

THE washing of bulky precipitates is a tedious operation, since it often requires a long time until the precipitate settles, and a considerable quantity of the first saline solution remains in the vessel, even after careful decantation. The process may be much abbreviated by tying over a large glass funnel a piece of muslin, and over this a piece of filtering paper, then attaching a long rubber-tube to the neck, and placing the inverted funnel low into the precipitating vessel, while the tube hangs down on the outside. By suction, the liquid is caused to pass into the funnel and tube, and the latter will then continue to act as siphon until there is but little liquid left in the residue. It need hardly be mentioned that the water must be renewed several times, and siphoned off in the described manner.

As an example, a quantity of golden sulphuret of antimony, which formerly required three days for complete washing, could be finished in one day.—WILLIAM SARTORIUS in *Pharm. Zeit*, 1881, No. 94.

The Molecular Weight of Calomel.

THE direct termination of the vapor-density of calomel does not afford the means of deciding conclusively whether a molecule of calomel consists of $HgCl$ or Hg_2Cl_2. Debray's investigations, namely, have shown that calomel, when in vapor, is dissociated, and a mixture of the vapors of Hg and $HgCl_2$ has the same density as the molecule $HgCl$. While Odling assumed that the dissociation was complete, it has been shown by Marignac that it is only very trifling. Now, if a molecule of calomel consisted of Hg_2Cl_2, the density of its vapor—if only slightly dissociated—would have to approach more nearly to the number 16.28 (the figure expressing the density of non-dissociated vapor of Hg_2Cl_2) than to 8.14 (expressing the density of non-dissociated vapor of $HgCl$). The density was found to be, in three experiments, 8.35, 8.21, and 8.23. Fileti has recently determined the vapor-density of calomel in an atmosphere of corrosive sublimate. He found that no dissociation took place, and that the density was, in two trials, 8.01 and 8.30. From this it follows that the correct molecular formula for calomel is $HgCl$.

Improvement in the Manufacture of Carbolic Acid.

THE process which is followed at present by all manufacturers of carbolic acid, consists in treating the high-boiling fractions of coal-tar (over 140° C. = 284° F.) contained in a large cylindrical boiler with dilute solution of soda, and subsequent removal of the latter by hydrochloric acid. The intimate mixture of the soda solution with the tar-oils is accomplished, in some establishments, by a special stirring arrangement, but the same object may be attained by a strong current of air blown through a tube, reaching nearly to the bottom of the boiler, and branching off in various directions.

As soon as all the carbolic acid contained in the tar-oils has combined with the soda—which may be recognized by a measured sample of the uncombined oils not diminishing in volume when shaken with soda solution—the mixture is allowed to remain at rest until the heavier phenol-sodium solution has settled, when it is drawn off through a faucet, and transferred to large, flat iron pans placed under a light shed, in the open air, to permit the free escape of the disagreeable vapors. The rather dilute brown-colored solution is concentrated until a film of crystals appears on the surface. During this time it also separates various oxidizable impurities and tarry products. The liquid, which has acquired about the consistence of thin molasses, is next diluted with one-eighth of its volume of water, and then drawn off into a deep, wooden vat, situated alongside of the evaporating pan, where it is decomposed by hydrochloric acid. The carbolic acid collects on the top, and is afterwards removed for further treatment. The other products—chloride of sodium and impurities—being at present entirely worthless, are simply thrown away. All the caustic soda, therefore, required for this process is lost.

While the effect of carbonic-acid gas on phenol-sodium solution has long been known to partially decompose the latter, yet a complete separation of the phenol had not been considered possible. Mr. R. Heinze, of Dresden,* however, has found that, under certain conditions, particularly under observance of certain degrees of concentration and of temperature, a total separation of phenol may be accomplished. This process, therefore, converts the soda into the carbonate, which may be reconverted into caustic soda by heating its solution with a thin milk of lime in the usual manner.

The requisite carbonic-acid gas is proposed by the inventor to be derived from the chimney-gases of the works. By means of a steam-jet apparatus, the gases are aspirated, and, under considerable pressure, are conducted through an iron pipe of about eight *cm.* (3⅛ inch.) internal diameter into the vat, the pipe ending, near the bottom, in a broad sieve-like head According to the smaller or larger percentage of carbonic acid in the gas, the carbolic acid gradually separates as an oily, red-brown upper layer. Though still impure, yet it has already an aromatic odor.

The further treatment of the crude acid is the same as that in the present process. After having been drawn off, it is several times subjected to fractional distillation, and those portions which pass over between 180–200° C. (356–392° F.) are filled in clean carboys, in which the pure acid separates in white needles on exposing the carboys to cold. When crystallization is completed, the carboys are turned over, and, after the impure liquid acid has drained out, broken. The crystallized acid is then melted and packed in bottles.

Nitrite of Amyl and Nitroglycerin as Remedies for Tooth-Ache.

DR. ATKINSON, in *The Practitioner*, says that nitrite of amyl or a one-per-cent solution of nitroglycerin applied to an aching tooth, by means of cotton-wool, will rapidly diminish or abolish the pain.

* *Neueste Erfind. und Erfahr.*, 1881, 517, after *Journ. f. Gasbeucht. und Wasserversorg.*

Boonekamp of Maagbitter.

K. SALBACH furnishes the following two formulæ to the *Pharmaceutische Zeitung:*

1.	Oranges, unripe (petits grains)	100 parts.
	Orange peel	30 "
	Gentian	60 "
	Cascarilla	30 "
	Turmeric	15 "
	Cinnamon	25 "
	Cloves	15 "
	Rhubarb	7.5 "
	Alcohol	750 "
	Distilled water	165 "
Digest and filter. Then add		
	Oil of star-anise	2 parts.
	Sugar	250 "
2.	Orange peel	20 "
	Cascarilla	15 "
	Gentian	15 "
	Rhubarb	10 "
	Turmeric	10 "
	Alcohol	400 "
	Water	500 "
	Sugar	100 "

The Cultivation of Vanilla, Cocoa, Cloves, etc., in Seychelles.

THE vegetable resources of Seychelles have recently received some attention in a report that has been drawn up by the chief civil commissioner. It seems that the cocoanut trees (*Cocos nucifera*) in the islands have of late years been devastated by a disease that has spread rapidly amongst them. Though the disease has been known in the islands constituting the Seychelles group for several years past, it has only latterly become so virulent as to arouse in the minds of the inhabitants a sense of alarm. The consequence is that the owners of estates are turning their attention to other products, and it is pointed out that the islands are among the richest spice-producing countries in the East. It is prophesied that in the future the principal products of the Seychelles will be undoubtedly vanilla, cocoa, and Liberian coffee, the cultivation of which has, of late, been much extended by a few enterprising inhabitants.

At the present time, there are about one hundred and fifty acres of vanilla planted, about one-half of which is in bearing. The sample of Seychelles vanilla, exhibited at the last International Exhibition at Paris, obtained the first prize, and the present market value in Paris is quoted at 80 francs per pound. An ordinary vanilla plantation, or "vanillerie" as it is called, is about five acres in extent, and at a moderate computation represents a production of 250 lbs. of vanilla per acre. A clear profit of Rs. 10 a pound, after deducting all expenses of production, shipping, and freight to Europe, may be accepted as a fair calculation, thus giving a profit of Rs. 2,500 an acre.

On one estate, seven acres in extent, of which five and a half acres are planted, the owner was offered last year 100 francs a kilo, or about £2 per pound for the first crop of vanilla, which represented 270 lbs. weight. On this same estate, the second crop this year is estimated at 600 lbs. This estate is worked entirely by twelve African boys.

There are about one hundred acres of cocoa in cultivation, and the quality is pronounced by judges in Europe to be unsurpassed. The trees bear the fifth year after planting, though in some instances they have been known to bear after three years. It thrives magnificently, and the trees everywhere are healthy and vigorous, and seem admirably adapted to the soil in all parts of the island.

The attention of the Seychellois has again been attracted to the cultivation of cloves, and there are one hundred and fifty acres under cultivation. The writer of the report says he has written "again attracted," because he regrets to say that the lazy habits of the people have led to the wanton destruction of acres of this spice. Mr. Horne, the

director of the Mauritius Botanic Gardens, in his admirable report on these islands, dated the 20th May, 1875, writes as follows: "The manner in which the islanders gather the cloves is both reckless and wasteful; they cut off all the branches of the trees, although they are well aware that several years must elapse before the trees again reach the bearing stage, and, in fact, that many of them will die altogether." The cloves could easily be gathered from the highest trees by means of a bamboo ladder, and Mr. MacLeod, H.B.M., Consul at Mozambique, writing of Seychelles in 1859, twenty-two years ago, says, "this year two-thirds of the cloves that are produced by the remains of the spice gardens, established by Mahé Labourdonnais, were left on the ground for want of labor to save them." Since that date they have been cut down for firewood.

The value of the Seychelles cloves is about £4 the 100 lbs. The last lot sent home realized £6 the 100 lbs., but this was exceptional.

Cologne.

MR. CHARLES T. GEORGE recommends the following formula:

Oil of neroli	1
" bergamot	4
" rose	1
" coriander	2
" yellow santal	2
Extract of vanilla	8
" jasmine	8
" musk	8
" orris	16
Benzoic acid (from gum)	4
Alcohol, deodorized	pints 12
Distilled water	pints 3

Mix.

Extract of vanilla: Rub 4 oz. of vanilla and 8 oz. of sugar to a fine powder, and add 4 oz. of deodorized alcohol. Macerate two weeks, and filter.

Extract of musk: Grain musk, 3 dr.; solution of potassa, 6 dr.; deodorized alcohol, 3 pints.

Extract of orris: Orris root, 4 lbs.; deodorized alcohol, sufficient to make 4 pints. When thoroughly extracted, gradually add 4 drams of pure sulphuric acid; and, after two days, with occasional shaking, add 2 oz., or a sufficient quantity of carbonate of barium, and filter.

The extracts of jasmine—also of orange and rose in the next formula—are made by washing the pomade with deodorized alcohol, one pound of pomade yielding one pound of extract. This is "triple" extract. For colognes it need only be half as strong.

The same author also recommends the following *Orange Cologne:*

Oil of neroli	3 2
" bergamot	3 4
Extract of jasmine	1
" orange	4
" musk	4
" rose	3 4
Alcohol, deodorized	pints 3½
Orange-flower water	pint ½

Mix.—*Proc. Pennsylv. Pharm. Assoc.*

New Process for Preparing Heavy Magnesia.

DR. P. E. ALESSANDRI proposes the following method, which is both simple and rapid, for preparing the "heavy" calcined magnesia:

Take ordinary calcined magnesia, free from carbonate, moisten it, in a mortar, with pure, absolute alcohol, and triturate it, at first gently, afterwards with some force, but not rapidly. During the agitation, the magnesia is to be moistened three or four times with fresh portions of the alcohol, and the operation is suspended when the bulk of the magnesia appears to remain stationary. To remove the mass, dry it, rub it to powder, and pass it through a sieve.

The product occupies only about one-fifteenth of the original bulk.—*Toscana Indust.* in *Bolletino Farmceut.* (Milano), xxi., 42.

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THE INTERNATIONAL ENCYCLOPÆDIA OF SURGERY. A Systematic Treatise on the Theory and Practice of Surgery by Authors of Various Nations. Edited by JOHN ASHHURST, Jr., M.D., Professor of Clinical Surgery in the University of Pennsylvania. Illustrated with chromo-lithographs and woodcuts. In Six Volumes. Vol. I. New York: William Wood & Co., 1881, pp. 717; Roy. 8vo.

"IN the first volume are embraced such subjects as may be looked upon as belonging to General Surgery, including Inflammation, regarded both from the position of the Pathological Histologist and from that of the Clinical Observer and Practical Surgeon; Erysipelas and Pyæmia; Hydrophobia and Glanders; Scrofula and Tubercle; Rachitis and Scurvy. Articles follow upon the Reciprocal Effects of Constitutional Conditions and Injuries; upon the General Principles of Surgical Diagnosis; upon Operative Surgery in General; upon Plastic and upon Minor Surgery; upon the Use of Anæsthetics; upon Shock; upon Traumatic Delirium and Delirium Tremens, and upon Amputations." (Editor's Preface.)

Included in this volume is a chapter on "Anæsthetics and Anæsthesia;" by Henry M. Lyman, M.D., Professor of Physiology and Diseases of the Nervous System in Rush Medical College, Chicago, in which, in addition to a history of the subject, the author describes the Phenomena, Physiology [Pharmacodynamics?], Mode, Accidents, and Employments of Anæsthesia; Various Methods of Producing Insensibility; Mortality Consequent upon Artificial Anæsthesia; Post-mortem Appearances, and a description of Anæsthesia-producing Substances. Strangely enough, when we consider the special study which he has given to the subject of nervous diseases and physiology—the author makes no distinction between *anæsthesia* and *analgesia*, or absence of common sensibility and absence of sense of pain; and he makes no attempt, as one might reasonably expect of him, to correct the misuse of the former word when employed—as in the present instance—to indicate the latter property of the agents employed.

The work itself comprises the writings of some of the most able authors of this and other countries, and deserves to rank as the best treatise in the language.

TRANSACTIONS OF THE MEDICAL ASSOCIATION OF GEORGIA. Thirty-second Annual Session, 1881. Edited for the Association by A. SIBLEY CAMPBELL, M.D., Secretary. Augusta, Ga.: 1881, pp. 314, 8vo.

THIS is one of the handsomest volumes of this class of publications that has reached us, and contains the usual minute of proceedings, and the reports, addresses, and papers in full, followed by memoirs, Constitution and By-Laws, and Roll of Members.

Among the papers, the following are especially worthy of note here: "Uses of the Fluid Extract of Ergot," by J. G. Hopkins, M.D.; and "Quinine and Tar-water as Antiseptics," by De Saussure Ford, M.D. The report also contains an account and portrait of Dr. Crawford W. Long, whom Dr. Sims pronounced to be the "discoverer of anæsthesia."

ANNUAL REPORT OF THE COMMISSIONER OF AGRICULTURE FOR THE YEAR 1880. Washington: Government Printing Office, 1881, pp. 672, 8vo.

THE contents of this bulky volume embraces reports of the Commissioner, Chemist, Statistician, Entomologist, Botanist (on Grasses); of Dr. D. E. Salmon, on Swine Plague and Fowl Cholera; of Drs. James Law and H. J. Detmers, on Swine Plague; of Dr. C. P. Lyman, on Contagious Pleuro-pneumonia, and papers on Aphthous Fever, or Foot-and-Mouth Disease; Texas Cattle-Fever; Bronchitis in Cattle; Deerfoot Farm Centrifugal Dairy; Progress of Forestry Investigation; Potato Raising in Tennessee, etc., etc. Illustrations in color, photography, lithography, and xylography are numerous and interesting.

REPORT OF THE PROCEEDINGS OF THE FIFTH INTERNATIONAL PHARMACEUTICAL CONGRESS, London, 1881. London: Pharmaceutical Society or Great Britain, 1881, pp. 299, 8vo.

WE have already published in NEW REMEDIES most of the matter of special importance which this volume contains, but all who are interested in the progress of pharmacy will find this report of great value. The text of most of the addresses is given in the language in which they were originally presented, and accompanied with a translation, so that the book is adapted for circulation where these languages are common. Dr. Paul and Mr. Passmore have edited the work under the authority of the Pharmaceutical Society of Great Britain, and the Society have published it in handsome style.

TRANSACTIONS OF THE MEDICAL SOCIETY OF THE STATE OF NEW YORK FOR THE YEAR 1881. Published by the Society; pp. 495, 8vo, with Appendix Containing Laws of the State of New York of Interest to the Medical Profession, not Printed in the Appendix to the Transactions of 1880.

ALTHOUGH containing less than usual matter relating to materia medica and therapeutics, this volume of Transactions is still of exceptional interest to physicians. Much space is devoted to subjects connected with Public Hygiene—a branch of medical science in which this Association has always taken an active interest.

THE SYMPATHETIC DISEASES OF THE EYE. By LUDWIG MAUTHNER, M.D., Royal Professor in the University of Vienna. Translated from the German by Warren Webster, M.D., Surgeon U. S. Army, and James A. Spalding, M.D., Ophthalmic Surgeon to the Marine General Hospital, etc. New York: William Wood & Co., 1881, pp. 220, 8vo.

CATALOGUE OF SOLUBLE MEDICATED GELATIN PREPARATIONS. Manufactured by CHAS. L. MITCHELL, M.D., Philadelphia.

KILNER'S MODERN PHARMACY AND DRUGGISTS' FORMULARY. November, 1881 (quarterly), pp. 62, 8vo.

THIS supplement gives additional formulas for Elixirs, Toilet Articles, Syrups, Tinctures, Wines, Ointments, Steatins, etc.

A CASE OF POISONING BY RESORCIN. By WILLIAM MURRELL, M.D., M.R.C.P., etc. Reprinted from the *Medical Times and Gazette*, London, 1881, pp. 7.

ADVANCE SHEETS OF FIRST BIENNIAL REPORT OF THE COMMISSIONERS OF PHARMACY FOR THE STATE OF IOWA, 1881, pp 36, 8vo.

TRANSACTIONS OF THE TWENTY-EIGHTH ANNUAL MEETING OF THE MEDICAL SOCIETY OF THE STATE OF NORTH CAROLINA. Held at Ashville, N. C., May 31st, 1881, pp. 128, 8vo. *No index.*

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PROCEEDINGS OF THE WISCONSIN PHARMACEUTICAL ASSOCIATION. Second Annual Meeting, 1881, pp. 51, 8vo.

PROCEEDINGS OF THE NEW JERSEY PHARMACEUTICAL ASSOCIATION. Eleventh Annual Meeting, 1881, pp. 66, 8vo.

THIS includes also a list of the Registered Pharmacists in the State of New Jersey.

PROCEEDINGS OF THE OHIO STATE PHARMACEUTICAL ASSOCIATION. Third Annual Meeting, 1881, pp. 75, 8vo.

DIE PFLANZENSTOFFE in chemischer, physiologischer, pharmakologischer und toxikologischer Hinsicht. Von DR. AUG. HUSEMANN, Dr. A HILGER, und DR. THEOD. HUSEMANN. 2te Aufl. Vol. i., No. 2. 8vo, Berlin, 1882. [The Proximate Principles of Plants, etc.]

WE have already in our January number, p. 27, drawn the attention of our readers to the first part of vol. i. of the new edition of this important work. The second part has also reached us, and completes one half of the work.

The present issue completes the proximate principles of the Cryptogamæ, and comprises the following portion of the Phanerogamæ (after Eichler's system):

I. Gymnospermæ.

II. Angiospermæ; the whole of the Monocotyleæ, and of the Dicotyleæ, the families up to and including Paconieæ.

Throughout the work, the vast literature which has appeared since the first edition has been judiciously and critically utilized for correcting former statements and bringing the information down to the latest possible day.

We have compared a number of the more prominent articles with our own indices and memoranda covering the literature that has been accessible to us during the last ten years, and have found nothing of importance missing.

The typographical execution is excellent, and misprints have been encountered by us but seldom.

THE ANATOMY OF THE MOUTH-PARTS AND OF THE SUCKING APPARATUS OF SOME DIPTERA. By GEORGE DIMMOCK, of Cambridge, Mass. (Dissertation for the Degree of Phil. D. at the Leipzig University. Roy. 8vo, Boston, 1881. With four plates. (From the Author.)

OVER SPIRITUS ÆTHERIS NITROSI. 8vo, and

OVER JAPANESCHE SAKE. 8vo. (On Spir. Ætheris Nitrosi, and on Japanese Saki). By PROF. J. F. EIJKMAN, of Tokio, Japan. (From the author).

BEITRAG ZUR KENNTNISS DER PAPAVERACEEN-ALKALOIDE. Von J. F. EIJKMAN, Tokio. 8vo, Yokohama, 1881.

BEITRÄGE ZUR CHEMIE DER NYMPHÆACEEN. Inaugural Dissert. Von WILHELM GRUENING. 8vo, Dorpat, 1881. (From Prof. G. Dragendorff).

BESIDES the discovery of two nearly allied alkaloids, one in *Nuphar luteum* (nupharine) and the other in *Nymphæa alba*, the author has paid special attention to the peculiar tannins contained in these plants, which he found to have a stronger tendency towards decomposition than any other tannin known.

BEITRÄGE ZUR UNTERSUCHUNG DES PILOCARPINS UND SEINER SALZE. Von A. CHRISTENSEN, aus Kopenhagen. 8vo.

UEBER DIE QUANTITATIVE BESTIMMUNG DES CHININS ALS HERAPATHIT. Von A. CHRISTENSEN. 8vo. (Both from Prof. G. Dragendorff.)

PROCEEDINGS OF THE CONNECTICUT PHARMACEUTICAL ASSOCIATION. At the Fifth Annual Meeting. Also, the Constitution, By-Laws, and Roll of Members. 1881, pp. 97, 8vo.

ANNUAL REPORT OF THE SUPERVISING SURGEON-GENERAL OF THE MARINE HOSPITAL SERVICE OF THE UNITED STATES for the Fiscal Year 1881, pp. 247, 8vo.

THIS report contains, among other matters of interest, several valuable papers on "Beri-Beri."

ANNUAL ANNOUNCEMENT OF THE SCHOOL OF PHARMACY OF THE UNIVERSITY OF MICHIGAN for the Fourteenth Year (1881–82).

THIS pamphlet contains a complete list of Alumni and an Index to Published Contributions of Original Work done by Graduates and Students of the School of Pharmacy during the last decade.

THE THERAPEUTIC VALUE OF IODIDE OF ETHYL. By ROBERT M. LAWRENCE, M.D., of Boston. Reprinted from the *Medical Record*, pp. 8, 8vo.

NOTES, QUERIES AND ANSWERS.

Under this heading we shall, to the best of our ability, endeavor to answer such questions addressed to us, as come within the scope of this journal, provided they are accompanied by the name and address of the writer. Answers to queries received after the 5th of the month will lie over until the next issue. Unless special instructions to the contrary accompany the query, the initials of the correspondent will be quoted at the head of each answer.

When asking for the formula of an unusual, patented, or proprietary compound, always accompany the query with any information you may already possess regarding the locality in which it is used, its use and reputed effects, in order to enable us to make inquiry without waste of time and labor. When it can conveniently be done, send also a specimen of the label used on packages of the compound.

No. 1007.—**Baking Powder** (Missouri).

If none of the formulæ heretofore given will answer your purpose, you may modify the constituents by using cream of tartar instead of tartaric acid.

Mix 4 lbs. of well-dried bicarbonate of sodium with 4 lbs. of dry wheat-flour and 9 lbs. of pure, dry, and powdered cream of tartar. Or, 4 parts of bicarbonate of sodium may be mixed with 9 parts of cream of tartar when the mixture is wanted for use. Preserve in tightly closed vessels.

The quantities of bicarbonate of sodium and bitartrate of potassium (cream of tartar) are chosen so as to neutralize each other as much as possible:

$NaHCO_3$	+	$KHC_4H_4O_6$	=	$NaKC_4H_4O_6$ +
bicarbonate of sodium		bitartrate of potassium		tartrate of sodium and potassium
84		188		
or 4	to	9		
		+ $2H_2O$ +		CO_2
		water		carbonic acid gas

No. 1008.—**Preparation of Hydrogen Dioxide** (O. S.).

Although hydrogen dioxide (peroxide of hydrogen) may be prepared from the ordinary commercial barium dioxide (binoxide of barium), yet the yield is so unsatisfactory that it is under all circumstances advisable to employ a purified barium dioxide. This is prepared in the following manner:

Commercial barium dioxide is reduced to a very fine powder, and small portions of the latter are added, from time to time, to dilute hydrochloric acid (spec. grav. 1.050) until the latter is nearly neutralized. The solution having been cooled and filtered, it is treated with a small quantity of baryta water, whereby any ferric and manganic oxide, silica, or alumina are precipitated. As soon as a white precipitate of crystalline hydrated barium dioxide makes its appearance, the solution is filtered, and to the filtrate concentrated baryta water added; this causes a precipitation of crystalline, hydrated barium dioxide. It is well washed and preserved, in its moist condition, in stoppered bottles.

To prepare hydrogen dioxide, small portions of the moist barium dioxide are gradually added to a cold mixture of 1 part of sulphuric acid and at least 5 parts of distilled water, taking care to prevent the temperature from rising beyond 20° C. (68° F.), and suspending the addition when the liquid has only a slightly acid reaction. The precipitated sulphate of barium is allowed to deposit, and the liquid filtered off. It is best to retain the slight excess of sulphuric acid since the compound keeps better. The solution thus obtained, which scarcely ever contains over five per cent of hydrogen dioxide, may be concentrated either by exposing it in vacuo, over sulphuric acid, at a temperature of 15–20° C. (59–68° F.), or it may be exposed to cold, and the frozen portion removed. The residuary liquid will be much more concentrated, as hydrogen dioxide does not freeze, even at − 30° C. (− 22° F.). If the solution is allowed to evaporate over sulphuric acid, it may happen that bubbles of oxygen begin to be given off. In this case, the further addition of a few drops of sulphuric acid will arrest further decomposition.

The aqueous solution, if not too strong, can be preserved for months, if it be kept in a cold place not exposed to day-light.

Hydrogen dioxide is easily soluble in ether. If the aqueous solution be shaken with ether, the latter dissolves out the dioxide. This ethereal solution is much more stable than the aqueous solution, and may even be distilled without decomposition.

The quantity of hydrogen dioxide present in any aqueous solution may be determined by strongly acidulating the liquid with sulphuric acid, and adding from a burette a solution of potassium permanganate of known strength until the purple tint of the latter is no longer destroyed. In this case, the following reaction takes place:

$$K_2Mn_2O_8 + 3H_2SO_4 + H_2O_2 =$$

Potassium permanganate. Sulphuric acid. Hydrogen dioxide.

$$= K_2SO_4 + 2MnSO_4 + 4H_2O + 3O_2$$

Potassium sulphate. Manganese sulphate. Water. Oxygen.

Each gram of potassium permanganate used corresponds to 0.108 *gm.* of hydrogen dioxide.

The reaction here quoted is given on the authority of Roscoe and Schorlemmer. According to others (Wislicenus, Schoene, Trommsdorff), the proportions are these:

$$K_2MN_2O_8 + 3H_2SO_4 + 5H_2O_2 = K_2SO_4 + 2MNSO_4 +$$
$$(314) \qquad +8H_2O + 5O_2$$

hence, 1 gram of potassium permanganate would correspond to 0.541 gram of hydrogen dioxide.

During the past year, renewed attention has been drawn to this agent, and the most extraordinary curative effects have been attributed to it—with what true reason the future will show. It is, for instance, stated that "no physician, who has only once tried hydrogen dioxide applied in spray to suppurating eyes or suppurating wounds, will ever want to be without it." "Passing a few times across a sick-chamber while projecting a spray of a two-per-cent solution renders the air odorless and pure," etc., etc.

As it is not improbable that the compound will at least more frequently be experimented with, some statements contained in a recent circular of H. Trommsdorff,* the well-known manufacturer of chemicals at Erfurt, Germany, will be of interest:

It is occasionally stated that distilled water can contain "ten volumes of hydrogen dioxide." This is wrong, and is due to an erroneous conception of the words "ten volumes," which is attached to the quotation of the article in price-lists. Hydrogen dioxide, in its pure state, is a *liquid*, and not a gas; and the "ten volumes" is meant to say that the product contains ten volumes of available oxygen; or, in other words, one measure of the commercial liquid can give off ten measures of oxygen. This corresponds to a strength of only three per cent of hydrogen dioxide. A "two-volume" solution would be one which gives off twice its volume of oxygen, or which contains 0.6 per cent of hydrogen dioxide.

The qualification, "ten volumes," originated in England some ten years ago, when the substance was first put upon the market, and this qualification has been adopted in the price-lists of all countries. Most of these products contained only about half the pretended quantity; besides, many of them were impure, being often nothing else than a solution of commercial barium dioxide in dilute hydrochloric acid and possessing but feeble keeping qualities. A single English firm prepared a chemically pure hydrogen dioxide which kept pretty well. Trommsdorff has examined many samples, and has never found more than 2.75 per cent by weight of real hydrogen dioxide. An invoice which left England on March 20th, 1878, was found by Trommsdorff, after it reached him, on April 6th, to contain 2.6 per cent, and when again assayed at the end of May, only 2.4 per cent. At present,

* Communicated by the author.

Trommsdorff's product contains three per cent, or varies but a trifle around this figure.

It must be preserved in a cold, dark place, in glass-stoppered bottles, which should be small, if the consumption of the article is insignificant.

No. 1009.—**Compound Syrup of Hypophosphites** (A. Th. and G. W. W.).

The original formula given by Churchill is somewhat indefinite. But the following is usually used in practice:

Calcium hypophosphite	256	grains.
Sodium "	192	"
Potassium "	128	"
Iron " moist	69	"
Hypophosphorous acid	240	"
Syrup of vanilla	8	fl. oz.
Boiling water, sufficient.		

Rub the hypophosphites in a capacious mortar, with 4 fl. oz. of hot water and the hypophosphorous acid. Allow the mixture to deposit during a few minutes, decant the clear solution, and triturate the residue with more hot water until the salts are dissolved. Filter the solution and bring it to the volume of 8 fl. ounces, by passing more water through the filter if necessary. Add the syrup of vanilla, and, if any cloudiness should appear, remove this by the addition of a further small quantity of hypophosphorous acid.

The American Pharmaceutical Association has adopted the followiug formula:

Calcium hypophosphite	256	grains.
Sodium "	192	"
Potassium "	128	"
Iron sulphate (green)	185	"
Hypophosphorous acid, spec. grav. 1.036	9	fl. drams.
Sugar	12	troy oz.
Water, sufficient.		

Dissolve 96 grains of the calcium salt in 4 fl. oz. of water with the aid of heat, and acidulate the solution with a small proportion of the acid. Dissolve the sulphate of iron in 2 fl. oz. of water; mix the two solutions, allow the mixture to stand a short time, and pour it on a paper filter, wash the precipitate on the filter with a small quantity of water acidulated as before, and preserve the filtrate. Dissolve the remainder of the calcium salt, with the other hypophosphites, in 4 fl. oz. of water with the aid of heat, adding the remainder of the hypophosphorous acid. Mix the solution and the reserved filtrate, adding enough water to complete 10 fl. oz., and pour the liquid into a bottle containing the sugar. Agitate the mixture occasionally, until the solution is complete, and filter through paper, if necessary.

In connection with the preceding a recent paper by Adam Gibson, read at a meeting of the North British Branch of the Pharmaceutical Society, and published in the *Pharm. Journal* of January 21st, will be of interest, as it contains some useful and practical information.

No. 1010.—**Mouth-Washes** (J. P.).

The following are well recommended:

Violet Mouth-Wash:

Tincture of orris	½	pint.
Oil of rose (3 oz. to 1 gall.)	60	drops.
Oil of bitter almonds	5	"
Alcohol	1	pint.

Eau Botot:

Tincture of myrrh	¼	pint.
" krameria	¼	"
" cedar wood (1:5)	1	"
Oil of rose	10	drops.
" peppermint	15	"

"*Botanic Styptic:*"

Myrrh	2	oz.
Krameria	2	"
Cloves	2	"
Alcohol (50%)	2	pints.

Macerate fourteen days, and strain.

Tincture of Myrrh and Borax:

Borax	1	oz.
Honey	1	"
Myrrh	1	"
Red saunders	1	"
Alcohol (50%)	2	pints.

Triturate the honey and borax together in a mortar, then gradually add the alcohol, the myrrh and red saunders, and macerate for fourteen days.

No. 1011.—**Elixir of Wild Cherry and Iron** (A. Th.)

You may use the following formula:

Pyrophosphate of iron	128	grs.
Water	q.s.	
Fluid extract of wild cherry	1	fl. oz.
Simple elixir, to make	16	fl. oz.

Soften the pyrophosphate of iron with about 2 fl. drachms of warm water. Add it to the simple elixir, and shake until it is dissolved. Lastly add the fluid extract.

Another formula, based upon that given by Mr. Oscar Oldberg (in his unofficial Pharmacopœia) may be given thus:

Solution of ferric phosphate, with citrate of sodium	10	fl. drachms.
Fluid extract of wild cherry	12	fl. "
Compound elixir of orange, or, simple elixir, to make	1	pint.

The solution of ferric phosphate with citrate of sodium is prepared thus:

Solution of chloride of iron (U. S. P.).	40	parts.
Phosphate of sodium	48	"
Citric acid	33	"
Bicarbonate of sodium, sufficient, or about	39	"
Water, sufficient,		
To make	100	parts.

Dissolve the phosphate of sodium in 500 parts of water, and add to the solution, gradually, and under constant stirring, the solution of chloride of iron, previously diluted with 200 parts of water. Wash the precipitated ferric phosphate, first by repeated affusion and decantation of warm water, using about 800 parts each time, and finally on a muslin strainer, until the washings pass tasteless. Then drain the precipitate well, and transfer it to a capacious porcelain capsule.

Reduce the citric acid to powder, put it into a capsule, pour upon it 70 parts of water, apply heat, and gradually add the bicarbonate of sodium until the solution is perfectly neutral to litmus paper; then filter it. Pour the solution of citrate of sodium thus obtained upon the moist ferric phosphate in the capsule, and heat the mixture, during constant stirring, until solution is effected. Finally, evaporate the solution until it measures 100 cubic centimeters, if the *parts* of ingredients taken are *grams*, or until it measures 100 fluid ounces, if the *parts* taken are troy ounces.

This solution contains about 0.25 *gm.* or 4 *grs.* of ferric phosphate in 1 fluid-drachm.

No 1012.—**Coal-Tar Saponiné** (B.).

This is an emulsion of coal-tar effected by means of the saponin contained in Quillaya, or "soap-bark;" or else by means of soap.

Demeaux's formula is as follows:

Coal-tar,
Soap,
Alcohol, of each, equal parts.

Mix and heat on a water-bath until the whole is dissolved. This is a true soap soluble in hot or cold water, which has been used for medicated baths, lotions, liniments, and as disinfectant.

Lebeuf, Lemaire, Gratiolet, and others use a mixture composed of

Coal-tar	10	parts,
Tincture of quillaya (1:10)	25	parts,

which is to be digested for eight days, and then filtered.

No. 1013.—**Kummerfeld's Lotion** (H. C. M.)

This is intended as an emollient application to the skin, particularly of the face. Its composition is the following:

Sublimed sulphur	2 parts.
Glycerin	2 "

Triturate them together until they are thoroughly mixed; then add

Glycerin	10 parts,
Spirit of camphor (1:10)	4 "
Spirit of lavender	10 "
Cologne	10 "
Distilled water	120 "

When wanted for use, it should be well shaken up.

No. 1014.—**"Red Wash."**

The correspondent asks for the formula of the "Red Wash" of St. George's Hospital, mentioned by Mr. T. Holmes. In Squire's fourth edition (1879) of the Pharmacopœias of the London Hospitals, this is given as follows: Sulphate of copper, 3¾ grs.; camphor, 1 gr.; Armen. bole, 3¾ grs.; boiling water, to 1 oz. This is otherwise known as "*Lotio Cupri Camphorata.*" Six other London hospitals have formulas for a "Red Wash," but the ingredients are quite different from the one above mentioned.

No. 1015.—**Red Oxide of Mercury Ointment** (see February number, p. 59).

In reply to No. 999 (H. C. G.) how to keep red oxide of mercury ointment made up to dispense without oxidizing, I can say that I have no trouble in preserving it perfect for months, by keeping the ointment covered by distilled water, to the depth of one or two inches.

H. C. MOORE.

BALTIMORE, MD.

No. 1016.—**Shampoo Liquid** (B. W. F.).

An aqueous infusion of soap-bark (from *Quillaya Saponaria* Molina) will answer quite well. If you desire to keep the liquid in stock, and have it scented, the following will answer:

Soap-bark, bruised or ground	2 oz.
Glycerin	1 fl. oz.
Cologne	2 fl. oz.
Alcohol	5 fl. oz.
Rose-water	8 fl. oz.

Digest during two days, frequently shaking. Then strain, express, and filter.

Barbers usually use carbonate of potassium (salt of tartar) in the proportion of 1 oz. to the quart, sometimes combined with some carbonate of ammonium. Bay-rum, cologne, or other scented liquids may be added, according to fancy.

Parchment Paper.

DEAR SIR:—In answer to query No. 1,006, I would say that Crane Co., of Dalton, manufacture all styles of parchment, including the paper on which the Government money is printed, with like threads.

Yours, etc.,
L. B. ATWOOD.

PITTSFIELD, MASS.

Almond Meal.

THE following formula is recommended for this useful cosmetic:

Almond meal, in fine powder, prepared from blanched bitter almonds, after the oil has been extracted	6 oz.
Orris root, in fine powder	4 "
Wheat flour	4 "
White Castile soap, in fine powder	1 "
Borax, in fine powder	1 "
Oil of bitter almonds	10 drops.
Oil of bergamot	2 drachms.
Tincture of musk	1 drachm.

Mix thoroughly, and pass the mixture through a fine sieve.—*Month. Mag. of Pharm*

NEW PATENTS.

[*Complete specifications and illustrations may be obtained of any one or more of the following patents by sending the number, title, name of patentee, and date of issue, with twenty-five cents for each copy, to the Commissioner of Patents, at Washington, D. C., together with the name and address of the person requesting the same.*]

248,904. *Gum Substitute.*—George F. Wilson, East Providence, and Phillip O'Rielly, Providence, R. I. The process of making a soluble gum from corn-starch by treating it with hydrochloric acid or its equivolent, drying, and roasting.

248,919.—*Combined Soda-water Apparatus and Tumbler Washer.*—William P. Clark, Medford, Mass.

248,918. *Apparatus for Drawing Soda-water and other Beverages.*—William P. Clark, Medford, Mass.

249,043. *Bottle-stopper.*—George Havell, Newark, N. J.

249,134. *Measuring Faucet.*—Frederic T. Williams, De Wittville, N. Y.

249,069. *Liniment.*—John W. McFarland, Rochester, Mo. A rubefacient liniment or embrocation, composed of spirits of turpentine, vinegar, gum camphor, corrosive sublimate (bichloride of mercury), oil of cedar wood, salt, and eggs.

249,208. *Measure, Bucket, etc.*—William J. Smith, Toledo, O.

249,210. *Weighing and Packing Machine.* Geo. D. Van Hoesen, Brooklyn, N. Y.

249,275. *Process of Drying Nitrates.* Thomas Varney, Oakland, Gal.

249,285. *Instrument for Transfusion of Blood.*—Eugene E. Allen, Grand Rapids, Mich. The blood is forced forward in a rubber tube by means of rollers arranged in a box. The tube is furnished with inserting points and a vent.

249,420. *Process of Manufacturing Phosphorescent Substances.*—Orlando Thowless, Newark, N. J., assignor to himself and Edward L. Molineux, Brooklyn, N. Y. The herein-described process of manufacturing phosphorescent materials, which consists in heating sea-shells red hot, treating them, while heated, with a bath of brine, then, after removal from the bath, mixing sulphur, and phosphide, and sulphide of calcium therewith, and finally subjecting the mixture to a white heat.

249,459. *Spoon and Ladle.*—Latitia P. Cottle, Woodstock, Ont., Can.

249,462. *Tooth-Powder.*—William Doepp, Homewood, Ill. Consisting of precipitated carbonate of lime, white sugar, white Castile soap, salicylic acid, oil of peppermint, and oil of cinnamon.

249,478. *Soft-Soap.*—Thomas W. Nichols, New York, N. Y.

249,483. *Scale.*—William W. Reynolds, Rutland, Vt., assignor to the Howe Scale Co., same place. By means of two frames in the inside mechanism, rocking arms, and supporting-hangers, with its other usual devices, the platform, knife-edged pivots, and their seats are raised and lowered together.

249,506. *Manufacture of Soap.*—Miguel de la Vega and Luiz D'Oliveria, New York, N. Y. As a new article of manufacture, a new and improved soap of castor-oil, consisting of castor-oil, potash, caustic soda, and water.

249,532. *Machine for Shaping Soap.*—John O'Keeffe, and William Robertson, Liverpool, County of Lancaster, England. Patented in England, Nov. 18th, 1880.

249,544. *Apparatus for Making up Packets of Powdered Materials, etc., for Sale.*—George Pritchard, Seaforth, near Liverpool, County of Lancastor, assignor to Robert Spear, Hudson, Liverpool, England. Patented in England, March 23d, 1881.

249,550. *Electric Pad.*—John L. Rowe, New York, N. Y.

249,553. *Medicinal Inhaler.*—Joseph W. Snyder, Phil-

adelphia, Pa. A receptacle for inhalents is incased on the edge of a pillow, so that patients may inhale during sleep.

249,678. *Automatic Syrup Dasher.*—Robt. Robinson, Brooklyn, N. Y.

249,800. *Safety Cabinet for Poisons.*—Henry P. Smith, Syracuse, N. Y., assignor of two-thirds to Herbert C. Leavenworth and Baron A. Mead, both of same place.

250,071. *Process of Manufacturing Albumen.*—Uno H. Hillman, New York, N. Y., assignor of one-half to Edward Emerson Waters, same place. The process of manufacturing albumen from fish spawn, consisting in adding to the crushed spawn sufficient water to dissolve the albumen, and evaporating the albuminous water by boiling under a vacuum at a temperature sufficiently low to prevent coagulation.

250,084. *Process of and Apparatus for Mixing Glucose with Cane-sugar.*—S. Morris Lillie, Philadelphia, Pa.

250,092. *Truss.*—John B. Mayer, Philadelphia, Pa.

250,117. *Manufacture of Glucose.*—Henry A. Weber and Melville A. Scovell, Urbana, Ill.

250,118. *Process of Manufacturing Sugar and Syrup.*—Henry A. Weber and Melville A. Scovell, Urbana, Ill. The manufacture of sugar and syrup from sorghum cane, by means of the process of exact neutralization of the expressed juice of the cane by carbonate of lime or milk of lime, or both, and the purification of the juice after neutralization and defecation by the use of bone-black filters.

250,163. *Bottle-Stopper.*—Stephen S. Newton, Binghamton, N. Y.

250,197. *Machine for Crushing and Mixing Granular and Pulverulent Material.*—Philip Henry Bracher, Wincanton, County of Somerset, Eng. Patented in England Jan. 15th, 1879.

250,201. *Sulphonated Compound of Rosaniline.*—Heinrich Caro, Mannheim, Baden, Germany, assignor to Badische Anilin und Soda Fabrik, same place. Patented in England Oct. 8th, 1877, in Germany, December 16th, 1877, and in France, Feb. 19th, 1878. Forms a new compound, a substitution compound, in which sulphuric acid unites with fuchsine to produce a tri-sulpho-acid rosaniline salt.

250,222. *Medical Compound.*—William H. Eaves, San Augustine, Tex., assignor to himself and Archibald C. Holmes, same place. The compound to be used for curing rheumatism and neuralgia, consisting of whiskey, gum guaiacum, bromide of potassium, potassium nitrate, and wine of ipecacuanha.

250,276. *Handle Attachment for Glass Bottles and Jars.*—J. Cheston Morris, Philadelphia, Pa.

250,278. *Hernial Truss.*—William Nelson, Little Fall, N. Y. A truss pad supported upon or by means of a number of spiral springs, which are placed beneath the same near its periphery.

Death of Sir Robert Christison, Bart., M.D., D.C.L., etc.—The death of Sir Robert Christison, Bart., M.D., D.C.L., etc., in Edinburgh recently, recalls a life service, both as chemist and author, that is known among the profession, almost as well in this country as it is in Europe. Born in Edinburgh July, 1797, he graduated an M.D. from the University of that city, in 1819, afterwards continuing his studies in chemistry under Robiquet, and in toxicology under Orfila, in Paris. In 1822, Christison, on his return to Edinburgh, was appointed Professor of Medical Jurisprudence to the University, in which department he published his celebrated "Treatise on Poisons," the first original work on toxicology written in the English language, and recognized as an authority by the Crown in various criminal trials. In 1823, Dr. Christison became a Fellow of the Royal College of Physicians, Edinburgh, and in 1832 succeeded to the chair of Materia Medica of the University. During this appointment, he issued his well-known revision of the "New Edinburgh Dispensatory." Besides these two standard works, Dr. Christison contributed largely to various scientific publications, by a number of memoirs, among them many on toxicological topics.

In 1838 and 1846, Dr. Christison was elected President of the College of Physicians, and in 1868, President of the Edinburgh Royal Society. In 1857, he became Crown nominee representing Scotland in the medical council, retaining that seat till 1873. During this appointment, he took a very active and prominent part in the preparation of a new national pharmacopœia, was created a baronet, celebrated his "jubilee" as professor, and resigned his professorial chair in 1877. Numerous official records are extant of his great services in the profession; the foundation of the Pharmaceutical Society being largely due to his efforts. One of the earliest electors of this society as honorary member, he remained the sole survivor of the twenty-three whose names appear on the list of 1842.

Personally, Dr. Christison was regarded, among his professional brethren and his pupils, as the *beau ideal* of professional chivalry; a man conscious of his own ability and his loyalty to the profession, and at the same time free from any shade of jealousy in regard to the success of others. In his youth, he was noted as the most accomplished athlete in the University, possessing a remarkably strong constitution, the vigor of which he retained even as an octogenarian, it being recorded that but four years ago, in pursuance of experiments as to the sustaining virtues of the coca leaf, he walked twice to the top of Ben Voirlich, one of the hills of Scotland, whose altitude and steep, rugged ascent would discourage the explorations of many a younger man.

He was eighty-five years of age, and a son of Mr. Alexander Christison, for many years a Professor of Humanity in the Edinburgh University.

College of Pharmacy of the City of New York.—The examination of the graduating class will begin on Wednesday, March 8th, and will be continued during the following days. The Commencement will be held on Wednesday, March 22d, at Chickering Hall.

PHARM. CALENDAR FOR MARCH.

N. B.—The officers of Societies, Colleges of Pharmacy, Pharm. Associations, etc., will oblige us by forwarding schedules of their meetings, lists of officers, and any changes that may be desirable.

Date.	Society Meetings.
Thurs. 2d.	New York Coll. Pharm.—Trust. Meet.
	Louisville Coll. Pharm.—Pharm. Meet.
	Massachusetts Coll. Pharm.—Trustees' M.
Frid. 3d.	Cleveland Pharm. Assoc.—Bimonthly Meet.
Mon. 6th.	Erie Co. Pharm. Asso.—Meet at Buffalo.
	Massachusetts Coll. Pharm.—Annual Meet.
Tues. 7th.	Philadelphia Coll. Pharm.—Trustees' M.
	Maryland Coll. Pharm.—Trustees' M.
Wed. 8th.	New York Coll. Pharm.—Alumni Meet.
Thurs. 9th.	Newark Pharm. Asso.—Annual Meet.
	Louisville Coll. Pharm.—Direct. Meet.
	Philadelphia Coll. Pharm.—Alumni Meet.
	Maryland Coll. Pharm.—Meet.
	New York German Apoth. Soc.—Meeting.
Mon. 13th.	Louisville Coll. Pharm.—Annual M.
Tues. 14th.	Pittsburg Coll. Pharm.—Trust. Meet.
	Chicago Coll. Pharm.—Trust. M.
	St. Louis Coll. Pharm.—Pharm. Meet.
	Massachusetts Coll. Pharm.—Pharm. Meet.
	Kings Co. Pharm. Soc.—Meet. at Brooklyn.
	National Coll. Pharm.—Meeting.
Thurs. 15th.	New York Coll. Pharm.—Annual Meet.
Tues. 21st.	St. Louis Coll. Pharm.—Trust. Meet.
	Philadelphia Coll. Pharm.—Pharm. Meet.
Mon. 27th.	Philadelphia Coll. Pharm.—Annual Meet.
Thurs. 30th.	Kings Co. Board of Pharmacy.—Meets at Brooklyn.